Safety audit of Dounreay 1998

Final report 2001
FOREWORD

This report is the last in a series which began in September 1998 with the publication of the findings of the Safety Audit of Dounreay.

The safety audit had been planned following our growing concerns over the material condition of the site, the rundown of staff and restructuring of the United Kingdom Atomic Energy Authority which had taken place throughout the 1990s, and the increasing transfer of responsibility for the day to day running of the Dounreay site to a Managing Agency staffed by contractors. On 7 May 1998, however, a mechanical digger damaged an electrical cable cutting power supplies to the site’s Fuel Cycle Area for 16 hours. As a result of that incident, my Deputy Chief Inspector responsible for the Dounreay site issued a Direction halting operations in the Fuel Cycle Area. I subsequently asked for the safety audit which had been planned for the autumn of that year to be brought forward. It was carried out in June 1998 by a multidisciplinary team comprising thirteen nuclear inspectors drawn from HSE’s Nuclear Safety Directorate, two inspectors from its Field Operations Division and an inspector from the Scottish Environmental Protection Agency. Interim progress reports have since been published in September 1999 and 2000.

The audit report contained 143 recommendations, the last of which called for UKAEA to provide an action plan to tackle the issues raised. On 30 November 1998 UKAEA published a report ‘Dounreay - The Way Ahead’ which set out its action plan to respond to the audit findings. This plan had been discussed with HSE and SEPA, and since then has formed the basis against which progress has been monitored by both regulators. Perhaps the most far reaching were two recommendations, R45 and R69, which required UKAEA to develop an integrated decommissioning strategy for the site and for dealing with its radioactive wastes.

As well as detailing the progress which the Authority has made in addressing each of the 143 recommendations, this report sets out the key elements of the Dounreay Site Restoration Plan which sets out how the site will be cleaned up over the next 55 - 60 years. Dates are given for the major projects which underpin the programme, and whose success will be crucial to meeting the overall timescale. I believe the Dounreay Site Restoration Plan sets an ambitious but achievable target. It is a significant step forward from earlier plans which envisaged lengthy periods of ‘care and maintenance’ for many of the important plants, and an overall timescale which would have been several decades longer.

This report groups the original recommendations into three kinds; those which have already been completed, those which will be completed over the medium term (several years), and those which will be accomplished as part of the site’s restoration plan. Timescales for the resolution of the second and third groups have now been agreed between UKAEA, SEPA and HSE, and it is our intention that progress against these timescales will now be monitored as part of our normal regulatory process. We intend on an annual basis to keep the public informed of progress through the regular reports which my Inspectors make to the Dounreay Local Liaison Committee. Copies of these, and the previous reports in this series are available on the HSE website at www.hse.gsi.gov.uk.
I have seen considerable progress at Dounreay over the past three years and this is a credit to everyone concerned, particularly the staff at Dounreay. The Consents we have granted over the last few months to allow the restart a number of plants within the Fuel Cycle Area are an indication of our growing confidence that safety at Dounreay is improving.

However, notwithstanding the genuine hard work which has already been done both at Dounreay and at UKAEA’s other sites to address the audit recommendations, the ability to deliver the Site Restoration programme will critically depend upon the Authority’s ability to recruit sufficient numbers of suitably qualified and experienced people to operate the site and manage the contractors who will be necessary to design and build the new facilities. The management at Dounreay is optimistic about this for the near future, however UKAEA will need to continue its initiatives to recruit and retain the necessary skilled staff to meet the challenges that lie ahead at Dounreay.

If you have any comments or would like further information on the issues discussed in this report, please write to me at the address below.

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EXECUTIVE SUMMARY

On 7 May 1998, an incident occurred at Dounreay in which a mechanical digger damaged an 11kV electrical cable. This incident interrupted the electricity supplies to the Fuel Cycle Area (FCA) of the United Kingdom Atomic Energy Authority (UKAEA) site at Dounreay. The emergency back-up supply failed to operate as intended and the FCA was without electricity for 16 hours.

The Health and Safety Executive’s Nuclear Installations Inspectorate had been concerned for some time about the effects of restructuring UKAEA and had planned to audit the management of safety at Dounreay. However, on the basis of the initial findings into the loss of electrical supplies, HM Chief Inspector of Nuclear Installations decided to bring forward the timing of the audit. It was carried out in June 1998 by a team of inspectors from NII, two inspectors from HSE’s Field Operations Directorate and an inspector from the Scottish Environment Protection Agency (SEPA). Further detail of the circumstances which led to the audit are provided in the original audit report (Ref 1) published on 1 September 1998 which included 143 recommendations.

The UKAEA response was set out in a detailed Action Plan entitled ‘Dounreay - The Way Ahead’ (Ref 2). This Action Plan, launched at a press conference on 30 November 1998, clearly showed UKAEA’s commitment to improvement. The plan allocated the recommendations into ‘theme groups’ and set out a time for completion of each action. Each theme group covered a range of recommendations and was tackled by a specific UKAEA team led by a Senior Dounreay Manager. In response, HSE and SEPA set up their own theme group ‘champions’, specialists to assess the adequacy of UKAEA’s safety submissions. Meetings and on-site inspections were carried out to monitor progress, and an administrative action tracking system was developed to assist in the close-out process of each audit recommendation.

Interim reports setting out UKAEA’s progress have since been published jointly by HSE and SEPA in September 1999 (Ref 3) and September 2000 (Ref 4). This is the final report to be published on the audit, since the only recommendations which remain outstanding are those associated with strategic decommissioning and waste management issues which will take many decades to address, plus a number of specific recommendations which will be progressed in a medium term programme over the next few years. These outstanding recommendations will be dealt with as part of our normal regulatory regime. Following discussions, UKAEA has produced forward programmes, based on the best available information, which address the outstanding recommendations and the Authority’s progress against these will be monitored.

UKAEA’s most important response to the audit has been to produce the Dounreay Site Restoration Plan (DSRP) which was delivered by the scheduled date. This identifies, in several volumes, the requirement for approximately 1500 activities which will be needed to complete the decommissioning of the site. The programmes which form part of the DSRP will form the basis for the future regulation of up to 20 major facilities which will need to be constructed in the next 15 to 20 years. The DSRP will provide the basic programme against which we will carry out the
Quinquennial Review for the Dounreay site, providing a five yearly update on progress. NII’s progress report will include a consideration of UKAEA’s progress on the strategic recommendations, which are directly linked to the DSRP, and the recommendations which have been placed on the medium term programme.

Although many of the audit recommendations were specific to UKAEA’s Dounreay site, a significant number covered generic or corporate matters. NII has, therefore, been proactive in agreeing and assessing the adequacy of UKAEA’s Southern Division approach. A summary of this work is provided in Section 3 which indicates that there has been good progress on all sites and that we are generally satisfied. However, some further work is still required particularly in the implementation of safety management systems.

Overall, UKAEA has carried out a significant amount of work over the last three years in addressing the requirements of the 1998 audit recommendations. There remains a lot to be done by UKAEA, the completion of which will be fundamental to the future decommissioning and restoration of the Dounreay site. We welcome the DSRP and recognise the good work which UKAEA has done to produce the plan on such a demanding timescale.

UKAEA will need to focus its attention on ensuring that there are sufficient suitable people to deliver the DSRP. At the detailed level, the DSRP remains dependent on a number of significant decisions which have still to be made and is subject to a number of project risks which are not wholly within UKAEA’s control. We therefore welcome UKAEA’s intention that the DSRP should be a living document, to be reviewed and developed in the light of experience.
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1 UKAEA RESPONSE TO THE AUDIT RECOMMENDATIONS

1 UKAEA’s response to the audit was to allocate the 143 recommendations into logical groups, to enable these to be addressed by common approaches and solutions.

2 The Action Plan divided the audit recommendations into the following six theme groups:

   • Management and organisation
   • Human resources and training
   • Operational strategy
   • Safety cases
   • Safety management systems
   • Safety culture

3 These theme groups are denoted by colours in Tables 1, 2 and 3 which indicate respectively whether the recommendations are closed out, are on a medium term programme, or are of a strategic nature and have been agreed to be on a longer term programme.

4 Each of the theme groups was led by a senior Dounreay manager and involved staff from Dounreay and other UKAEA sites in the development of solutions to address the requirements of each recommendation. Each group was responsible for assessing the recommendations within its area and producing integrated programmes and specifying the timescales and resources needed to implement the identified solution.

5 Of the 143 audit recommendations, UKAEA has satisfactorily responded to 89 recommendations which were associated with, for example, specific plant improvements or required UKAEA to introduce or modify its management systems. The remaining 54 recommendations will be completed in the medium to long term.

6 Twenty-seven recommendations will still take several years to complete, and have therefore been placed on a medium term programme. These recommendations will be monitored as part of our routine regulatory activities. UKAEA’s progress in the completion of these recommendations will be reported through our normal reports to the Dounreay Local Liaison Committee.

7 The remaining 27 recommendations are strategic in nature and, consequently, have very long timescales extending to several decades associated with their completion. Typically, these recommendations required UKAEA to develop decommissioning and waste management strategies and to construct major new facilities to condition and store radioactive wastes arising from the
decommissioning of redundant plant and facilities. These recommendations have been incorporated into the DSRP and will be successfully completed by the implementation of the DSRP.

1.1 Management and organisation

Photograph 1. The Waste Receipt Assay Characterisation and Supercompaction (WRACS) facility control room.

8 The audit found that UKAEA had undergone significant change in the eight to nine years since it had been licensed in 1990. A key finding of the audit was that the licensee, UKAEA, was not in day-to-day control of the site, processes and activities and its staff did not have full management of the operations of the plants. The closure of the Prototype Fast Reactor (PFR) in 1994, plus the transfer of employment of many UKAEA personnel to private companies, significantly reduced the level of resource and competence available to UKAEA. As a result of these changes, UKAEA placed increasing reliance on contractors to carry out many of the key safety functions previously performed by UKAEA staff. Although we do not object to the use of contractors as such, we found that in many cases contractorisation had extended too far. UKAEA could no longer demonstrate that it was in control of the contractors’ activities or that it was able to understand the safety features of the plant and set, interpret and implement relevant standards. In other words, it could not show that it was able to discharge an ‘intelligent customer’ capability.

9 Accordingly, a number of audit recommendations sought action to re-establish a management and procedural infrastructure to ensure that UKAEA is, and remains, in control of safety activities at Dounreay. The recommendations required UKAEA to put in place suitable management frameworks for the site,
develop an authoritative technical resource for the site, and improve its procedures for selecting and managing contractors. Twenty-three audit recommendations were allocated to this theme group and UKAEA has satisfactorily responded to all but three of them in accordance with the agreed dates. The three recommendations whose timescales extended beyond the publication of the DSRP have been placed on a medium term programme.

10 UKAEA revised its Dounreay management structure shortly after the audit. An important element of this change involved the transfer of key managerial posts from contractors to UKAEA. A revised policy on use and control of contractors has been rolled out across the site and this has been underpinned by supporting guidance.

11 In response to our concerns over the lack of an authoritative source of technical expertise within its own organisation at Dounreay, UKAEA has now established an engineering group. This group is the custodian of design standards and codes of practice, and is intended to function as the intelligent customer for engineering work on existing and new plants. The establishment of an engineering group is a positive development which helps to ensure that UKAEA is able to discharge the intelligent customer capability. It is important that this group has sufficient competent personnel across the range of technical disciplines which are implicated in nuclear plant design and operation. UKAEA is continuing to recruit people to fill posts in these areas. We consider that UKAEA should secure an adequate intelligent customer capability in the area of human factors. A new project management manual has been developed which provides guidance against which UKAEA can exercise management control over contracts and contractors.

12 We examined UKAEA's new management structures and arrangements. We are satisfied that UKAEA has taken positive steps to ensure that it is able to exercise proper management control over activities on the Dounreay site. We acknowledge that UKAEA may wish to implement further changes to its management structure as the Dounreay Site Restoration Plan develops, and in light of experience. Any such changes, however, will be subject to the arrangements which UKAEA has put in place to comply with a new nuclear site licence condition (LC36). This licence condition was recently added to all nuclear licences to ensure that changes to organisational structure and resources which might impact upon safety are properly managed. NII can call in any change proposal for examination, and for major changes, NII's agreement is required before UKAEA can implement them.

1.2 Human resources and training

13 A nuclear licensee should be able to demonstrate that it understands its competence needs, and that it has systematic processes in place to deliver and maintain these competences. The NII audit found weaknesses in UKAEA's arrangements for ensuring that its competence and training needs are systematically identified and delivered. Core skills, qualifications and experience needed to fulfil safety-related duties were not properly defined in post profiles. The training needs associated with these posts were not always set out clearly, and the training record system was incomplete. We also found that UKAEA's succession
planning arrangements, which should ensure that sufficient capable staff continue to be available to fill safety-related posts at the Dounreay site, were in need of review.

14 UKAEA responded to the audit recommendations by carrying out a thorough review of its systems for assuring competence. The review encompassed an examination of job and competence needs, identification of associated training requirements and a programme of training to fill "gaps" between the competences that post-holders have and those that they need. The Authority has taken steps to develop comprehensive post and training profiles for staff holding safety-related posts. Succession management procedures have been developed and implemented to ensure that suitable replacements will be available in the event of loss of personnel holding key safety-related posts. A computerised Human Resources Information system (HRIS) has been upgraded to provide a flexible means by which comprehensive training records can be maintained and accessed. Procedures are now in place to maintain the currency of training data within that system. A new scheme has also been introduced to improve the registration and monitoring of contractors' competences and training. A training manager has been recruited to ensure that the human resources and training work is taken forward in a systematic manner.

15 NII’s specialists in human factors have held extensive discussions with UKAEA throughout the development of this revised approach to human resources and training at Dounreay. We are satisfied that the identification, analysis and documentation of tasks involved in safety-related posts at Dounreay has been carried out appropriately, and that the adequacy and currency of these tasks will be reviewed annually by UKAEA. The recruitment of a Dounreay training manager is a positive step which gives training a better definition within the site and which should help to ensure that UKAEA training is consistent with modern standards. The development of the HRIS system should help UKAEA to maintain better control over its position management activities, although UKAEA needs to ensure that its staff understand HRIS, and use it consistently, if the system is to be effective.

16 Although UKAEA has taken significant and positive steps to establish a sound training and human resources infrastructure at Dounreay, many significant challenges remain. One key hurdle, which is faced by many nuclear operators, is the recruitment of sufficient competent people to enable the Dounreay Site Restoration Plan to be carried out to programme. Considerable reliance will continue to be placed on contractors, and NII will monitor UKAEA’s recruitment strategy to ensure that sufficient suitably qualified and experienced UKAEA employees are in place to manage the contractors and to maintain an intelligent customer capability.

1.3 Operational strategy

17 The audit raised a number of recommendations concerned with the management of decommissioning and radioactive waste on the Dounreay site. There was a general concern that there was a lack of progress in the decommissioning of redundant facilities and this was generally attributed to the absence of an integrated waste management and decommissioning strategy.
Typically, the Dounreay Fast Reactor was cited as a facility which had suffered delays in its decommissioning as a result of technical difficulties being encountered in a number of key projects. Additionally, the adequacy of the plant infrastructure to facilitate future decommissioning was raised in the audit. The importance of the need to develop waste treatment plants to condition the waste arising from the decommissioning of redundant facilities was also stressed.

Photograph 2. The Dounreay Fast Reactor (DFR) reactor floor after cleanup

18 This particular group of recommendations represented a major challenge as it required UKAEA to produce strategies and programmes extending to several decades in the future, addressing the decommissioning of complex nuclear facilities and the treatment and conditioning of many varying radioactive waste streams and historical nuclear fuel liabilities. As an immediate response to the audit, UKAEA has improved the working conditions in such facilities (see photograph 2) while the long-term technical solutions are pursued.

19 One of the key elements of UKAEA’s declared mission is now to manage the liabilities from its research and development programme in safe and secure ways which are environmentally acceptable (Ref 2).

20 In responding to these recommendations, UKAEA set up three separate groups, each headed by a senior manager, to consider the following:

- radioactive waste management
- management of fuel
- decommissioning
UKAEA’s response to these audit recommendations is covered in the DSRP. This report, which extends to several volumes, identifies the requirement for approximately 1500 activities to decommission the Dounreay site over the next 55 to 60 years. Over the next 20 years, up to 20 major facilities will need to be built to allow the existing, redundant plants to be decommissioned and the associated waste to be treated, conditioned and stored safely pending a decision on eventual disposal.

Since the audit, UKAEA has withdrawn from commercial reprocessing. Its principal focus is now on the restoration of the Dounreay site. The decommissioning programmes arising from the DSRP show the progressive dismantling of redundant plants coupled with the development and construction of new facilities to manage, condition and store the radioactive wastes arisings. The DSRP is discussed in detail later.

The recommendations associated with this theme group have very long timescales associated with their completion. Therefore, rather than keep these audit recommendations open, we accept that they will be completed through the implementation of the DSRP.

1.4 Safety cases

The audit raised a number of concerns relating to safety cases and associated issues including: linkage of safety reports to plant improvement and maintenance schedules; safety report production methods and processes; periodic review of safety reports and the categorisation of modifications.

The main objective of this group of recommendations was to encourage UKAEA to produce and implement safety documentation for its operations in line with modern practice. UKAEA has developed revised arrangements and methods for producing and reviewing safety cases to provide, for example, greater emphasis on the deterministic analysis of the performance of the plant and improved demonstration of the adequacy of the engineering.

The first two safety cases produced using these new procedures and methodologies have now been completed for two facilities at Dounreay: the Retrievable High Alpha/Low Beta Gamma Store (D9867) and the High Active Liquor Storage facility (D1208). The revised scope, format and safety assessment methodologies utilised at Dounreay will be reviewed as part of the current assessment of the D1208 safety report. Further discussion on the revised safety case production methods and processes will continue as part of the future UKAEA/NII/SEPA interactions. UKAEA has now produced programmes to update all safety cases at Dounreay in line with modern practice and has prioritised the programme on the basis of safety and the operational requirements of re-establishing the site radioactive waste management infrastructure.
27 UKAEA has embarked upon a number of initiatives within the safety case production and implementation processes which should strengthen the ownership and understanding of the safety cases by plant operators. Procedures have been developed which now require the production of future safety cases to involve plant operators, engineering/scientific specialists, peer reviewers as well as the safety case authors/specialists. Furthermore, UKAEA Dounreay has also developed procedures for the implementation of safety cases in which the plant operators are required to play a key role.

28 UKAEA has strengthened its Technical Assessments and Safety Department (TASD), which manages and co-ordinates the production of safety cases at Dounreay to provide an effective and adequately resourced service to manage the production and maintenance of safety cases for operational facilities, decommissioning and new engineering projects. UKAEA’s resources will need to be supported by extensive contract resources since it will be required to produce an increased amount of safety documentation to support the many projects and plant modifications arising from the DSRP. NII recognises UKAEA’s commitment to carry out this work; however, the task ahead is considerable. As with all the recommendations which can be closed out only in the medium to long term, NII will report progress routinely to the Dounreay Local Liaison Committee. If we see difficulties occurring, we will report these to the appropriate authorities for action to be taken to ensure UKAEA has the necessary resources to deliver its commitments.
29 UKAEA intends to produce a site services safety report to show that these services comply with appropriate engineering and safety standards in all important respects and to demonstrate that the services provided to each site facility are adequate and meet the necessary safety-related functional requirements. This report will need to address existing services and be updated to take account of any changes made to the modify the services required as decommissioning progresses (see Photograph 3).

30 The production of a revised operational safety case for the D1206 Reprocessing Plant was a priority within the UKAEA’s initial programme for the production of safety cases for those plants with the greatest hazard. However, as a result of the Government’s decision that no further reprocessing of PFR fuel would take place at Dounreay, UKAEA will now produce a decommissioning safety case.

31 UKAEA produced an interim version of a revised safety case for D1208 in April 1999 in response to an improvement notice issued in August 1998, with the full safety case being issued in March 2001. As noted above, this is the first safety case that has been produced to UKAEA’s revised arrangements. Our assessment of the D1208 safety report has yet to be completed but it will be taken forward as part of our normal regulatory activities.

32 Since the audit, UKAEA has undertaken a number of initiatives relating to the safety categorisation of modifications, and the associated procedures and guidance. However, the various initiatives have not all yet been fully developed, tested and implemented. We still have concerns about the adequacy of the modification categorisation procedures and their inappropriate application and we shall continue to use our regulatory powers to obtain the necessary improvements.

33 UKAEA was required to bring forward proposals for the improvements needed for the safe operation and decommissioning of the plants which make up the FCA at Dounreay. UKAEA has now established a plant improvement database. The vast number of improvements that have been identified will need careful prioritisation and will require significant resource to implement. We will monitor the delivery of these improvements through our normal regulatory activities.

34 To address various concerns relating to ventilation systems, UKAEA was required to carry out a site-wide review of active ventilation systems against modern standards. UKAEA has completed this review and a number of plant improvements have been identified. The timescales for implementing the ventilation improvements, which include those required by SEPA to address gaseous discharges on the Dounreay site, are such that progress in this area will be monitored through our normal regulatory activity as part of the medium term programme.

35 UKAEA was also required to review its procedures for the design and verification of safety-related computer software systems and to verify and validate any computer systems used to support criticality control. UKAEA has now produced new draft procedures adopting industry standards for the design and verification of computer software systems. UKAEA has now put in place criticality control systems.
that do not rely on software. We will ensure that UKAEA does not implement new software systems for criticality control purposes until the procedures have been fully integrated into the relevant systems.

36 A number of specific audit recommendations required UKAEA to improve and review the electrical systems on site. UKAEA has implemented a programme of routine earth testing for the whole electrical distribution system and discharge testing of the standby power batteries. Additionally, the installation of a new Guaranteed Interruptible Distribution (GID) system to supply safety related plant at the northern end of the FCA has been carried out. Although the main ventilation system has been connected to the GID, the connection of all remaining safety related equipment is ongoing. The adequacy of the improved system was demonstrated to NII by means of a loss of power test.

37 During the power failure in May 1998, the electrical protection system failed to operate as intended and the Dounreay staff who attended the site to recover the situation did not appear to fully understand the system. Therefore, we required UKAEA to improve the electrical systems to analyse the response of the system under fault conditions. Extensive work has been carried out by UKAEA to review and improve 11kV and 415V supply protection systems and it is now considered that the protection faults which contributed to the loss of supplies to the FCA in May 1998 have now been corrected.

1.5 Safety management systems
38 UKAEA has made significant progress in responding to the recommendations in the safety management systems and safety culture areas. Of the 23 recommendations in this theme group, only four have not been closed out as these have completion timescales which require them to be included in the medium term programme. The acquisition of additional resources and the strengthening of links with the rest of the nuclear industry in the UK and internationally has enabled Dounreay to set and meet realistic and practical targets and goals.

39 One of the main areas of work for UKAEA has been the development of an integrated management system for the corporate organisation. The structuring, architecture, access and content of this system is well developed. Work is still continuing to ensure that the related lower tier documents are reviewed and duplication and unnecessary documents removed.

40 This restructuring of the corporate documentation system provides a clear picture of the arrangements developed by UKAEA to meet its health, safety and environmental responsibilities. Not only are these arrangements more visible, but reviews and changes can be better managed so that the effects on lower tier documents are fully anticipated. The introduction of integrated auditing, which is growing in effectiveness, is a sign that the once separate managerial strands are beginning to fuse and provide a consistent approach better able to deal with regulatory requirements.

41 A key aspect of this theme group was for UKAEA to improve its emergency arrangements on the Dounreay site. Overall, we considered that although there were good aspects of UKAEA’s emergency arrangements, they suffered from a lack of co-ordination. The appointment of an experienced emergency planning manager and the strengthening of the team has been one of the major factors which have led to significant improvements being made by UKAEA in this area. The Emergency Command and Control training being provided centrally to all relevant Dounreay staff (see Photograph 4) provides tangible evidence of the commitment which UKAEA has given in its response to this group of recommendations.

42 UKAEA has made significant and lasting improvements to its corporate management system. The duplication of effort expended on safety, environment and quality issues has been tackled, and the unnecessary complexity of arrangements to meet statutory and programme requirements has been greatly reduced. The staff at Dounreay have a much better appreciation of the importance of effective safety management and are committed to improve their performance in this area.

1.6 Safety culture

43 UKAEA has met our requirements for all of the recommendations in this theme group. Initiatives aimed at improving communications and management visibility, learning from others and implementing safety performance monitoring, amongst others, have been put into place and these have helped to establish a more positive safety culture, not only amongst UKAEA staff but also within contractor organisations working at Dounreay.
44 Some of these initiatives have become embedded into routine working arrangements, notably the development of programmes of plant visits by management and the inclusion of proactive measures in the site’s Safety Performance Index. Of particular note is the effort made by UKAEA to increase all employees’ and contractors’ knowledge of the requirements of the site licence through the publication of the Site Licence Booklet.

45 Improvements in safety culture are in many ways subtle, with embedded attitudes not easily changed over short timescales. UKAEA has used a balanced approach to the introduction of initiatives that will improve the awareness of staff to the importance of safety as a fundamental element in achieving a successful business. This has increased the level of expectation of UKAEA staff and contractors with respect to the role of safety as it applies directly to them, for example, their desire to have modern, purpose-built changeroom facilities (see photograph 5). The establishment of a more questioning attitude within UKAEA’s organisation regarding the consequences of individual and team actions is being sought at all levels.

46 UKAEA has attempted to create an environment where its ongoing safety improvement programme will meet with a high degree of success and that learning from its own and others’ mistakes will be accepted as an essential element of this process.

47 We will continue to monitor of UKAEA’s safety culture improvements but from the great deal of work that has already been done at Dounreay, we believe there is a clear commitment to sustained improvements.
2 THE DOUNREAY SITE RESTORATION PLAN - DSRP

48 One of the main findings of the safety audit was that UKAEA needed to develop a comprehensive strategy for dealing with existing and future radioactive wastes at Dounreay. The audit also recommended that the radioactive waste management strategy should be integrated with the decommissioning strategy for the site as a whole.

49 These overall findings were expanded in a number of specific audit recommendations, primarily R45 which required UKAEA to develop a decommissioning strategy for the site, and R69 which required a comprehensive strategy for all wastes. Other related recommendations required UKAEA to produce:

- a strategy for dealing with fuels on the site (R39);
- a strategy to ensure that the site services and facilities required for decommissioning were available when needed (R65);
- a strategy for the handling and transportation of wastes on the site (R73)
- a comprehensive decommissioning programme for the site (R63).

50 UKAEA responded to these recommendations by producing the Dounreay Site Restoration Plan (DSRP) which we received in early October 2000 and which has been published on the UKAEA web site (Ref 5). The DSRP is a major achievement and represents the main vehicle for the delivery of our key objective of making the Dounreay site safe for future generations.

51 In the following sections we outline our views on the plan in general and on the dates for the projects which we consider to be key elements of the DSRP.

2.1 Key features of the Dounreay Site Restoration Plan and Programme

52 The DSRP consists of the following volumes:

Volume 1, Introduction and overview. This provides an introduction and overview to the constituent parts of the plan.

Volume 2, Restoration. This provides a strategic overview of the entire site restoration process.

Volume 3, Decommissioning Plan. This outlines the work necessary to dismantle and demolish the various facilities on the site on a zone by zone basis.

Volume 4, Dounreay Radioactive Waste Management Document. This describes the strategies, waste routes and facilities for dealing with existing and future wastes.

Volume 5, Estates and Utilities Plan. This addresses the long term site infrastructure (i.e. facilities and services) required to support the restoration of the site.
Volume 6, Nuclear Fuels Inventory and Management Plan. This addresses the management of all fuels on the site.

Volume 7, Contaminated Ground Decommissioning Plan. This outlines the approach to restoration of contaminated ground, both radiological and non-radiological.

As well as the DSRP, UKAEA also prepared a timetable, which is an overarching programme pulling together more than 1500 individual work activities in the form of a strategic ‘big picture’. These work activities range in size from major projects, such as the construction of the new Waste Treatment Plant (WTP), to lesser tasks such as the relocation of office accommodation. The programme is very wide in scope and covers existing and proposed new facilities and includes the key lifecycle dates for construction, operation and the decommissioning stages (where relevant). The programme takes account of the numerous interactions and linkages between the different facilities which constrain the order in which the activities can proceed.

In April 2000, UKAEA’s paper ‘Making the Right Choice’ (Ref 6) was issued by the DTI for public consultation, this contained three options for managing fuel from the Dounreay Prototype Fast Reactor (PFR). Volume 6 of the DSRP was issued in October 2000 and this contained strategies for all the Dounreay fuels, these strategies being supported by Best Practicable Environmental Option Studies (BPEOs). In the case of PFR fuel, Volume 6 was based on the three options in the consultation paper, as the outcome of the consultation was not then known. However, for planning purposes, UKAEA based the DSRP programme on the “Dounreay Strategy” which was the option involving refurbishment and re-commissioning of D1206 (the PFR Reprocessing Plant at Dounreay).

However, on 18 July 2001, the Minister for Energy, Brian Wilson, made an important announcement that ruled out the further use of the reprocessing facilities at Dounreay to deal with the irradiated PFR fuel. He asked for “UKAEA to take whatever action is necessary to ensure the safety and security of the fuel” and also that “UKAEA should now focus on the challenges of decommissioning Dounreay and consider the options for dealing with this fuel as part of the development of the overall site restoration plan”. It will take some time for firm proposals to emerge for the management of PFR fuel, and it is likely that some of the individual project dates will need to be changed when the fuel strategy is fully defined. We will require UKAEA to update the DSRP in line with the new fuels strategy when this is available.

### 2.2 Site restoration timescales

The DSRP is based on four separate phases of site management:

- The Operational Phase. This is basically the operations as described in Volume 6.
• The Decommissioning Phase. This is the period of active site restoration and covers the dismantling and demolition of facilities, the management of waste, and remediation of contaminated ground. Decommissioning essentially consists of three stages: Stage 1 decommissioning involves the removal of fuel, coolant and non-fixed items of plant such as process materials and rigs. Stage 2 decommissioning consists of the dismantling and removal of most of the remaining radioactive material. Stage 3 decommissioning is the demolition of the facility to return the site to a condition where no significant radioactive hazard remains.

• The Care and Surveillance Phase. This will provide an extended period of control of the site during which residual radioactive material can be monitored to ensure long term safety and during which further radioactive decay will take place. This phase is currently envisaged to last for some 300 years.

• The Post-restoration Phase. This is the period following removal of institutional controls associated with the Nuclear Installations Act.

57 The DSRP programme addresses the ‘big picture’ within the Operational and Decommissioning Phases i.e. from now until the end of site dismantling and demolition. Given the long time frame of the DSRP, and the unique nature of many of Dounreay’s facilities, forecast project timescales cannot ever be exact. In developing an integrated programme, UKAEA has followed standard project management practice: risks have been identified and assessed, and delivery dates are expressed as a range from ‘earliest practicable’ (assuming that none of the risks materialise in practice) to ‘committed’ (where time has been allowed to cover almost all foreseeable contingencies). The dates quoted in this report are UKAEA’s central estimates for the delivery of the relevant projects, falling roughly midway between these two extremes. As the DSRP is implemented, the uncertainties associated with these dates will progressively decrease. We will continue to monitor delivery dates as part of the formal review process agreed with UKAEA.

58 The programme is based on dismantling and decommissioning being complete within 55-60 years, which is a significant shortening of the overall timescales compared to UKAEA’s previous programme in which the decommissioning end date was around 2100. Much of this shortening of the programme has been achieved through the elimination of lengthy care and maintenance periods between successive phases of decommissioning.

59 When considering the ‘big picture’, the revised shorter DSRP timescales are consistent with one of NII’s fundamental expectations of decommissioning, that is, decommissioning should be undertaken as soon as reasonably practicable, taking account of all relevant factors. There are, however, a number of individual projects which NII considers to be particularly important, either for the reduction of hazard on the site or because they are central to the overall site strategy.

60 The following paragraphs give an overview of how the status of the site will change with time as the DSRP programme progresses. The overview should be read in conjunction with Figure 1 which shows in broad terms the
design/construction, operational, and decommissioning stages for the some of the major DSRP projects (excluding the new facilities for fuels as these are not yet fully defined).

The First 10 Years (Up to 2010)

61 The most notable feature of this period is the large number of new facilities planned to be built and brought into operation, primarily radioactive waste treatment and storage plants. In most cases, the new facilities will be at an early stage of development. In the case of the management of radioactive wastes, the following new facilities are programmed to be designed and constructed in this period:

- four solid waste stores (or store extensions);
- two import/export facilities for existing stores;
- at least three solid waste treatment facilities;
- at least three liquid waste treatment facilities;
- facilities to segregate lightly contaminated soils.

62 A small number of new facilities for the characterisation, treatment, packaging and storage of fuels will also be required, though the exact requirements are as yet not known.

63 It is clear that the achievement of the overall DSRP timescales is crucially dependent on the new facilities referred to in paragraphs 61 and 62. Put simply, most of the site infrastructure required to decommission, treat fuel and convert waste into a passive state does not yet exist, and progress across the site as a whole depends on the timely provision of the above facilities.

64 Also in this period, design (and possibly construction) will need to be started for some of the facilities programmed to be operational in the first half of the second decade, for example, the Shaft Headworks and the Wet Silo Headworks. In addition, major modifications to services and utilities will be required, such as changes to the electrical distribution and site effluent systems.

65 Maintaining the timetable shown in Figure 1 will require significant commitment to a number of projects which NII considers to be important in the context of hazard reduction on the site. This is discussed in more detail later in relation to individual projects; for example, the vitrification plant (which is UKAEA’s current reference strategy for the treatment of high level liquid waste pending the outcome of its BPEO study) should have started full operation by the beginning of 2012. In addition, Stage 1 of PFR and Dounreay Fast Reactor (DFR) decommissioning should be well advanced, which will mean that the bulk of the liquid metal coolant will have been removed from both reactors and most of the breeder fuel will have been removed from the DFR reactor vessel. The new Waste Treatment Plant (WTP), which is vital to the delivery of the DSRP, is planned to
come into operation by 2008 to receive historic wastes stored on the site. This leaves only 7 years to obtain any necessary planning, safety and environmental clearance and design, build and commission the plant.

The Second 10 Years (2010-2020)

66 In this period,

- all the liquid high level waste will be conditioned to put it in a passively safe state;

- DFR breeder fuel should have been transferred to Sellafield for reprocessing;

- all radioactive waste should have been retrieved from the silo and most of the waste retrieved from the shaft, and conditioned to ensure it is safe for long term storage;

- decommissioning of DFR and PFR should be well advanced;

- a new facility for the long term management of Low Level Waste (LLW) should be operational; and

- export of Plutonium Contaminated Material (PCM) to Sellafield should have commenced.

67 Progress should also have been made during this period with the treatment of other fuels, but programme dates are not available at the current time for the reasons given earlier.

68 The scheduled progressive conversion of radioactive materials into a passively safe state during this period should result in a significant reduction in the hazard on the site. As facilities are generally programmed to move into decommissioning as soon as they become redundant (in the majority of cases with no care and maintenance intervals), decommissioning should be proceeding across a broad front.

The Third 10 Years (2020-2030)

69 Decommissioning of fuel treatment plants should be complete during this period and decommissioning of a number of redundant radioactive waste facilities should have started and in some cases be completed. Transfer of PCM to Sellafield should be nearly finished. At the end of this period, numerous facilities should have been demolished. The most significant plants still undergoing decommissioning will be:

- the D1208 Liquid Effluent Storage and Treatment Plant;

- DFR;
• PFR; and
• the Dounreay Materials Test Reactor (DMTR),

The Fourth 10 Years (2030-2040)

70 During this period, the decommissioning of DFR, PFR and DMTR will be completed. D1208 decommissioning should be well advanced and decommissioning of a variety of radioactive waste facilities and unconditioned radioactive waste stores should be complete. The main facilities remaining will be

• D1208;
• WTP;
• the Waste Receipt Assay Characterisation and Supercompaction Plant (WRACS);
• various support facilities and services (e.g. low level effluent treatment plant); and
• various stores.

The Fifth 10 Years (2040-2050)

71 D1208 will be decommissioned as will various waste plants (such as WTP), support facilities and services. The plan also assumes that conditioned Intermediate Level Wastes (ILW) held in various stores will be sent to a national repository starting in the year 2040. (Note that if the repository is not available, the conditioned waste will have to be stored longer.)

The Sixth 10 Years (2050-2060)

72 Finally the ‘back-end’ waste plants, stores and various support facilities are programmed to be decommissioned in this period. These include

• the low level liquid effluent plants and associated cementation facility;
• WRACS; and
• the laundry for cleaning potentially radioactive clothing and personnel protective equipment

73 The current completion date of the decommissioning programme is 2056. However, although all of the current plants on the site will have been demolished and the majority of radioactive waste removed, there will need to be a care and surveillance period of around 300 years for some parts of the site.
2.3 Key DSRP projects

74 Figure 2 identifies those projects in the DSRP which we consider to have the greatest importance to the reduction of hazard on the site.

75 Owing to the current uncertainty concerning the fuels strategy, it has not been possible to include fuel plants within this figure. However, it is clear that when the strategy is defined, some of the fuel facilities will fall into this category of ‘Key DSRP Projects’. The following paragraphs explain why these particular projects are important and comment on the programme dates.

Prototype Fast Reactor (PFR) Decommissioning

76 At the present time, the reactor vessel of PFR contains approximately 900 tonnes of sodium. Sodium is a hazardous material since it is reactive in the presence of water and/or air. Therefore, the removal of the bulk of the sodium by processing it through the sodium disposal plant by the end of 2003 is important for the reduction of hazard from PFR. Residual sodium will have been removed from the internal reactor components by 2008 and the end of Stage 1 decommissioning will be in 2011. The removal of the lengthy care and maintenance interval (60+ years) between Stages 1 and 2 in UKAEA’s earlier programme is one of the main reasons why it has been possible to reduce significantly the site decommissioning end date.

77 To achieve the desired Stage 2 decommissioning programme for the PFR, it will be necessary to have the radioactive waste packaging plant in operation.

Dounreay Fast Reactor (DFR) Decommissioning

78 At the present time, the reactor vessel of DFR still contains about 1000 breeder fuel elements and the sodium/potassium alloy used as the reactor coolant. The bulk of the coolant is programmed to be removed and sent to the treatment plant by 2010 and the breeder fuel will be removed in the period between 2004 - 2012. Both of these projects are important for the reduction of hazard. The timescale for the removal of breeder fuel is also important because this fuel needs to be sent to Sellafield for reprocessing before the B205 Magnox Reprocessing Plant is finally shutdown in 2012, although this could be later depending upon the throughput schedules achieved (Ref 7).

79 DFR Stage 2 decommissioning also depends upon the availability of the radioactive waste packaging plant.

Radioactive Waste Retrieval from the Liquid Effluent Storage and Treatment Plant D1208

80 D1208 contains a significant inventory of radioactive waste which is in liquid form and therefore not passively safe. The liquid wastes include the radioactive waste streams from reprocessing PFR, DFR and MTR fuels, which are essentially fission products dissolved in nitric acid, Ammonium Diuranate (ADU) floc and
solvents. ADU floc is a relatively thick sludge which arises from the decontamination of effluent streams, and the solvent is a waste stream from reprocessing operations.

81 UKAEA has confirmed that Dounreay is the most appropriate location for the treatment of the liquid fission products which have arisen from reprocessing operations. UKAEA therefore proposes to construct and commission a new vitrification plant together with storage facilities for the vitrified product: these are programmed to come into full operation in early 2012. As this facility is very important for the reduction in hazard from D1208, we will expect UKAEA to make every effort to achieve the programme dates.

82 In the case of MTR liquid fission product, the current strategy is to continue to condition the waste in the comparatively new Dounreay Cementation Plant (DCP) at a rate of about one tank per year. UKAEA has stated however that it is exploring ways to increase the throughput of DCP to enable the conditioning of MTR raffinate to be completed earlier. We welcome these developments.

83 A final decision on the strategy for dealing with DFR liquid fission products has not yet been taken, although the reference strategy is still encapsulation through DCP after MTR liquid fission products have been processed. It is currently programmed that this will be complete by about 2013.

84 The timescales currently included in the DSRP programme for the conditioning of ADU floc is the late 2020s. In 1999, NII expressed reservations about the structural integrity of two of the three ADU floc storage tanks, and about any future slippages to the emptying programme quoted at that time (approximately 2012). Since the production of the current version of the DSRP, UKAEA has reconsidered the strategy for ADU floc and has provided more recent information which recognises that these timescales may need to be brought forward. As this subject is still under review, we have been unable to include the dates in Figure 1. However, we will continue our discussions with UKAEA to ensure that ADU floc conditioning is carried out in a timescale which takes due recognition of the integrity of the tanks.

85 UKAEA currently proposes to treat contaminated solvents and oils in a new site-based treatment process, the construction of which is currently planned to be complete by mid 2004 and will require Authorisation by SEPA. However, this proposal will need to be confirmed when the outcome of UKAEA’s BPEO study is known.

Waste Treatment Plant (WTP)

86 The purpose of this facility is to condition solid ILW into a passive state and it is pivotal to meeting the planned timescales for the DSRP. It will receive decommissioning and operational radioactive wastes from a wide variety of sources on the site including the shaft and wet silo, other decommissioning projects, and ILW currently stored on site. The WTP is so important within the overall site solid ILW strategy because there are a number of other key facilities that will depend on it. UKAEA plans to commence operation of the WTP in 2008, although some parts of it may come into operation at a later date. As this facility is important for the
overall reduction in hazard across the site, we expect UKAEA to make every effort to achieve this date.

**Conditioned Waste Store (CWS)**

87 UKAEA currently envisages that this will be the only long term storage facility at Dounreay for conditioned ILW. It will receive conditioned waste from the WTP and from other Dounreay radioactive waste treatment facilities. The store is planned to be operational from 2008 to coincide with the operational date of the WTP. Again, as this is such an important plant, we will expect UKAEA to make every effort to achieve this date.

**Shaft Headworks**

88 The shaft headworks plant will contain the equipment necessary for the retrieval of Intermediate Level Waste from the D1225 shaft. Retrieval of radioactive waste from the shaft is clearly a key project. UKAEA is looking at the possibility of advancing the shaft retrieval programme, but has stated that a decision cannot be made at this stage as there are too many technical uncertainties. We will continue to press UKAEA to consider the scope for advancing the shaft retrieval programme but in view of the importance of the project we will expect UKAEA to make every effort to commence retrieval by 2014.

**Wet Silo Headworks**

89 The Wet Silo is an underground concrete vault storing a range of ILW under water. As the WTP is programmed to be operational from 2008, and because retrieval of waste from the shaft is currently programmed to start in 2014, there is currently a ‘window of opportunity’ to retrieve waste from the wet silo before the shaft. Wet silo waste retrieval is therefore programmed to start in 2011. In view of the significance of this project to the reduction of on-site hazard, we will expect UKAEA to keep to this date.

**New LLW Facility**

90 Considerable quantities of LLW will be produced at the site in the future, mainly as a result of decommissioning activities. Disposal of new arisings at Dounreay has now ceased because the original disposal trenches, Pits 1 to 6, are nearly full. Consequently, significant quantities of LLW are currently in interim storage which, in our view, is not a suitable long term management solution for this waste. Long term management of LLW is very important to the DSRP. UKAEA is currently undertaking a BPEO study into long term LLW management, which will establish a way forward.

91 Current national policy for managing LLW is to send it to the national LLW disposal facility at Drigg at the earliest opportunity (i.e. LLW is not normally stored on site). We hold the view that UKAEA should dispose of low level waste as soon as possible using the recognised route until such times as a viable alternative may
become available. The obvious option is to send to Drigg that waste which is compatible with Drigg’s acceptance conditions. UKAEA’s new LLW arisings now comply with this standard, therefore this is a possibility. UKAEA would, however, need the appropriate authorisations to transfer waste in this way. We believe that UKAEA should apply, without delay, for the necessary authorisation to make interim LLW disposals to Drigg.

92 We consider that UKAEA needs as a matter of urgency to pursue rigorously the BPEO study, which it is currently undertaking, to establish the way forward. We will ensure that our obligations for statutory consultation on the interim use of Drigg are concluded before UKAEA carries out its stakeholder dialogue on the BPEO study.

D9867 Contact Handled ILW

93 Contact Handled ILW is often referred to as Plutonium Contaminated Material (PCM). UKAEA’s reference strategy is to transfer the PCM currently held in the existing D9867 store, to BNFL’s Sellafield site for supercompaction, over-packing into stainless steel drums and cementation in the Sellafield Waste Treatment Complex. This will be followed by interim storage at Sellafield pending a long term management solution. UKAEA has assumed in the DSRP that transfers to Sellafield would not take place before 2010.

94 An extension to the existing D9867 store may be required to allow retrieval and loading of PCM containers into transport packages suitable for off-site transport. There may also be a need for additional storage space, should the existing capacity of D9867 be reached before the export route is established.

95 UKAEA recognises that there is a risk associated with the Sellafield route as this depends on the performance of the Sellafield facility and the ability of BNFL to accommodate the Dounreay PCM within the Sellafield PCM strategy. UKAEA has identified the need for a fallback strategy which is to construct a new PCM supercompaction facility at Dounreay, with storage of the waste at Dounreay after treatment. A decision to adopt the fallback strategy does not need to be taken for some years. We will monitor the situation to ensure that any necessary decision is taken at the appropriate time.

2.4 Summary evaluation of the DSRP

96 The project timescales presented in the DSRP programme are generally considered to be consistent with NII’s expectation that decommissioning should be undertaken as soon as reasonably practicable. It can be seen from the previous paragraphs that there are several important projects for which we would welcome a further acceleration in timescales if that is found to be reasonably practicable.

97 As stated previously, the current DSRP is based on the assumed “Dounreay Strategy” for PFR fuel (Ref 6) which has now been ruled out by the recent Ministerial announcement, and UKAEA has been advised to consider other options for this fuel in the development of the DSRP. The effect of this decision on the overall DSRP
programme is difficult to judge, although some projects should be largely unaffected. However UKAEA has stated in Volume 1 that if the “Minimum Treatment Strategy” was adopted (i.e. PFR fuels treated at Dounreay to put them into a form suitable for interim storage and eventual disposal), then the main effect on the programme would be that the decommissioning of the D1206 reprocessing plant could be brought forward by over a decade, but there would be no significant effect on the site restoration end date. We understand that UKAEA is re-evaluating the options for dealing with fuel on the site, and it is inappropriate for us to speculate about the nature of the facilities that UKAEA might propose or their timing. It is our aspiration however, that when the DSRP is updated in line with the fuels strategy, there will be no significant slippage in the treatment of nuclear materials to convert them into a passively safe state.

98 Most of the activities included in Figure 2 are the subject of individual audit recommendations on specific aspects. The audit recommendations in question are: R46 - R49 for PFR; R50 - R53 and R135 for DFR; R61 for the shaft; R62 for the wet silo; R71 for the vitrification plant; R72 for oils and solvents; R75 and R76 for PCM; R77 for the WTP; and R80 for LLW. UKAEA’s response to these recommendations is discussed in the Appendix.

99 Many of the key DSRP activities discussed above will involve significant construction projects. However a single date for each activity (such as “construction complete”) does not indicate the totality of the work involved. Many of these key DSRP tasks require a number of precursor or “enabling” activities, some of which are significant projects in their own right. This is illustrated by the example in Figure 3 which shows the main tasks required before the construction of the Shaft and Silo Headworks.

100 The manner in which NII intends to monitor UKAEA’s progress with the implementation of the DSRP programme is explained in more detail later. The general approach, however, will be to regulate the main projects through our normal licensing procedures and to monitor progress of the overall DSRP against a suitable selection of the earlier deliverables of the type shown in Figure 3.

2.5 Resourcing the DSRP

101 The DSRP identifies a vast programme of work, particularly in the first 10-15 years when decommissioning projects will proceed in parallel with the construction of a significant number of new facilities which are needed to deliver the overall DSRP. The availability of people, and how they are managed, is an important factor when considering the delivery of the site restoration programme. In our 1998 audit report we stressed the special legal considerations that apply to nuclear licensed sites, which place an absolute duty on the licence holder to ensure safety, and which mean that the licence holder must be in effective control of activities on the site. Where contractors are used, the licensee should have sufficient in-house competence and knowledge so that it is an “intelligent customer” for contracted-out work. One of the major findings of the audit was that UKAEA at that time was over-dependant on contractors for the delivery of many of the key functions which we would expect to see under the clear control of UKAEA as the licensee for the
site. It is against that background that NII has an interest in UKAEA’s proposals for how the delivery of the DSRP will be managed.

102 UKAEA has outlined the resource strategy for the DSRP in Volume 1 of the Plan and this identifies four principal resources:

- The UKAEA resource, which is the core group of UKAEA staff necessary to fulfil the conditions of the nuclear site licence.
- Additional (contracted) Technical Resource, which will act under the direct control of the UKAEA core team. These resources may be located off site, visiting the site as required.
- An Implementation Contractor resource, which will essentially design and/or build the new plants and equipment and decommission plants under UKAEA control.
- A service contractor resource, which will provide routine support services to the site and those working on the site.

103 UKAEA has clearly made efforts to secure additional resource at Dounreay. It has also put in place a planning process which should enable it to identify the resource needs. However, as yet, UKAEA has not developed the DSRP projects to a level where detailed estimates of staffing needs can be made. We have concerns that UKAEA will be unable to secure sufficient in-house resource to manage the programme, or sufficient contract resource to support the design, planning and safety case functions. However, UKAEA is optimistic about its ability to continue to attract sufficient numbers of suitably qualified and experienced persons to deliver the site restoration plan to the timescales that have been agreed.

104 We conclude that, although UKAEA has put in place processes to identify its needs and to recruit personnel, there is not yet solid evidence about the future effectiveness of these processes. We therefore intend to undertake further assessment of UKAEA’s proposals for resourcing the DSRP when more details are available.

2.6 Risks and uncertainties

105 NII recognises that the DSRP remains dependent on a number of significant decisions which have still to be made, for example, those associated with the fuels treatment strategy. UKAEA will need to modify the DSRP and programme once such decisions are made. We also accept that the current DSRP programme is subject to a number of potential project risks, some of which are not wholly within UKAEA’s control, e.g. planning inquiries, funding provisions, government policy issues, social factors etc, which may significantly change the DSRP programme dates.

106 In addition to NII and SEPA, the DSRP has also been reviewed by one of the Working Groups of the Radioactive Waste Management Advisory Committee
(RWMAC), set up to advise the Secretary of State for Environment, Food and Rural Affairs (DEFRA) and, post devolution, Scottish Ministers. RWMAC’s published view (Ref 8) is that the DSRP ‘provides a sound basis for future restoration work’ but that ‘a number of areas require further attention, in particular the timescales identified for some major decommissioning projects, but these are not insurmountable difficulties’ and that ‘provided adequate funding and access to the necessary expertise are available, UKAEA is quite capable of meeting the technical challenges posed by site clean up.’

107 The Department of Trade and Industry (DTI) is also carrying out a structural review of UKAEA which could lead to significant changes in the way nuclear liabilities are managed in the UK.

108 In view of these risks and uncertainties, the current DSRP and programme can only be regarded as the first issue of an evolving suite of documents. We therefore support UKAEA’s intention, expressed in Volume 1 of the DSRP, that it will be a living document which will be reviewed and developed in the light of experience.

2.7 SEPA’s comments on the Dounreay Site Restoration Plan.

109 SEPA considers that the main focus of the DSRP is currently on hazard reduction and management of the liabilities held on the Dounreay site. Limited focus has been given to the off-site issues and the restoration of the wider environment that has been affected by UKAEA’s historical activities at Dounreay. Current priorities have yet to fully reflect environmental risks.

110 UKAEA has acknowledged a number of the limitations amplified by SEPA. UKAEA has informed SEPA that an environmental impact assessment is under preparation at Dounreay in which UKAEA intends to address the following issues:

- The objectives and outline plans for reducing liquid radioactive discharges over the years in accordance with UK commitments under the Oslo Paris Convention for the Protection of the Marine Environment of the North East Atlantic.

- The management of Intermediate Level Waste and High Level Waste in the period before a disposal route becomes available. Plans for waste minimisation including dealing with free release issues.

- The strategy for minimisation of aerial discharges.

- Best practicable environmental option and environmental impact assessments for individual projects and statements from the site required under Article 37 of the Euratom Treaty.

111 UKAEA is also in the process of undertaking a ‘Best Practicable Environmental Option’ (BPEO) study to underpin waste management decisions on the Dounreay site. The preparation of this document is a requirement of the discharge authorisations granted to UKAEA by SEPA. The output of this study will
provide an overarching strategy for waste management at Dounreay that SEPA expects will inform UKAEA’s decision-making process related to the DSRP.

112 SEPA believes that UKAEA should develop an agreed consultation process for the DSRP and is awaiting its proposals. The aim of this is to foster broad acceptance amongst those most affected by UKAEA’s operations. SEPA has identified a model, successfully used by the US Department of Energy’s Environmental Restoration programme, on risk management with stakeholder participation which it has brought to UKAEA’s attention (Ref 9).

113 Environmental considerations related to the strategic recommendations from the audit now incorporated into the DSRP will be considered by SEPA when new authorisations are being drafted. All new waste management plants and processes will require authorisation from SEPA under the Radioactive Substance Act 1993 (RSA93). SEPA’s expectation is that the Best Practicable Environmental Option will have been selected for each process and that best practicable means will be employed during the operation of the plants to minimise discharges of radioactive waste to the environment.

2.8 Longer term monitoring and regulation

114 The recommendations of the audit which are covered by the Dounreay Site Restoration Plan require UKAEA to carry out a wide range of activities which should be completed in the longer term, such as the decommissioning of redundant buildings and the construction of new facilities. In these cases, it is clearly not appropriate for us to wait until all of the work has been carried out before closing out the audit recommendation. Instead, for such recommendations, we propose to set up a process for the formal review of UKAEA’s progress in meeting the programmes which are directly linked to the DSRP. In addition, those audit recommendations which have been placed on the medium term programme will be included as part of this review. Although the latter recommendations are not directly linked with the DSRP, they are associated with improvements to the site infrastructure and specific projects which will impact on the overall delivery of DSRP.

3 IMPLICATIONS FOR OTHER UKAEA LICENSED SITES

115 So far, this report has concentrated on the close out of the safety audit in respect to the adequacy of Dounreay’s response, and indeed many of the recommendations are specific to Dounreay alone. But there are also a significant number of recommendations which cover generic or corporate matters. UKAEA has had to co-ordinate its approach to these recommendations, because they apply not only to Dounreay but also to the other nuclear licensed sites that UKAEA operates - Harwell (Oxfordshire), Windscale (Cumbria) and Winfrith (Dorset). These latter sites, together with the UKAEA’s non-licensed site at Culham (Oxfordshire), form UKAEA’s Southern Division.

116 UKAEA also recognised the extended applicability of the audit recommendations, and in its response document ‘Dounreay - the way ahead’ UKAEA stated:
‘Many of the recommendations in the Audit Report are specific to the Dounreay site. But a number have implications for UKAEA’s corporate systems, or suggest similar improvements at UKAEA’s southern nuclear licensed sites.’

It is therefore appropriate in this report to comment on the way in which UKAEA Southern Division has reacted to the audit and applied them to their other nuclear licensed sites.

3.1 Actions at other UKAEA sites

117 Following the publication of the audit report, early discussions were held with the UKAEA’s other nuclear licensed sites to determine how they intended to respond to the generic issues. It was clear that their responses needed to be fully documented and capable of audit. A structured review of each of the recommendations was carried out by each site to confirm which recommendations were relevant and to assess the work that would be necessary to address them fully.

118 Since then these sites have been working to close out those audit recommendations which UKAEA believed were applicable, as well as implementing recommendations that were corporate-led. This work has generally had a site-specific focus, though for corporate matters, UKAEA opted for a centralised approach. By way of peer review, UKAEA’s own Internal Inspection Department (IID) has overseen this process.

3.2 Verification of response at other UKAEA licensed sites

119 Two distinct phases to the verification process were adopted. Firstly, there was the regular dialogue with UKAEA’s Southern Division staff led by site inspectors as part of their planned inspection programmes, which involved specialists where appropriate. This provided an assessment of the emerging picture of close out. Secondly, it was decided to undertake enhanced inspections across the other sites to establish a balanced view of the close out strategy and status.

120 We adopted a slightly different approach for these sites from the theme group approach which had been adopted at Dounreay. A review of the audit recommendations applicable to the other sites, led to the identification of six core topics by NII. These topics were sampled by NII across a wide range of audit recommendations during these enhanced inspections. In addition, several other audit recommendations were reviewed on a site-specific basis. The six core topics were:

- Safety management systems;
- Safety performance monitoring;
- Skills, recruitment and training;
- Safety awareness and learning;
- Waste management;
- Maintenance.
The enhanced inspections were conducted in teams of two NII site inspectors. They were concentrated typically in three-day site visits, leading to sharply focussed activities. This style of inspection promoted consistency and proved to be both efficient and effective. However, in view of our resources we could only sample the documentation at the Southern Division sites.

3.3 NII’s findings

NII was pleased to see that UKAEA’s Southern Division licensed sites had thoroughly reviewed all of the Safety Audit recommendations and had made good progress in implementing identified improvements. There were examples of existing good practice, which formed the basis for taking forward further improvements in the context of the Dounreay site. Clear evidence of why UKAEA’s Southern Division sites considered that they had implemented the requirements of recommendations was identified and also that adequate independent review had been carried out by IID.

For the six core topics inspected there was good progress at all sites, though further work needs to be done to complete the full implementation of new safety management systems compatible with modern standards.

Safety management systems

The audit found that UKAEA’s documented systems for managing safety, whilst having made significant strides forward, still required improvement and most importantly local integration. As a result, UKAEA set about rebuilding its systems, and ultimately produced a completely revised and electronically-formatted suite of corporate systems, the safety management section of which is called the UKAEA Safety, Health and Environment Procedures (USEPs). However, to make them fully integrated and applicable to all sites, separate implementing procedures containing site-specific detail have to be produced, and these are called Site Safety, Health and Environment Procedures (SSEPs). In this context, ‘implemented’ means having available completed, signed-off and issued documentation with all training needs identified and completed.

The majority of the work has been undertaken corporately to achieve a fully integrated management system. This took longer than UKAEA expected, but the corporate documentation is now complete. However, we found only limited evidence of SSEP implementation, and the delay is believed to result largely from the late running of the USEP programme. Following discussions with UKAEA, a common process for implementation has now been established and UKAEA has also produced an underpinning resource and implementation plan which provides confidence of success. This will also provide a link to other positive UKAEA initiatives such as the use of the ISRS safety auditing system (Ref 10) and ISO14001 mentioned previously. In a similar vein, the Environment Agency (EA) conducted an audit of systems related to radioactive waste discharge authorisations at Harwell.
126 Given the timescales for organisational change, we are pleased to find these positive indicators and we welcomed the developments. UKAEA should now expedite full implementation of its corporate procedures across all of its sites.

**Safety performance monitoring**

127 We monitored the visibility of managers on site and their monitoring of safety performance. We also examined the commitment of senior managers to safety.

128 There were good examples of safety performance monitoring at all sites. For example, at Winfrith there is a well-developed system of safety inspection, reporting of findings and progressing of actions. Whilst this system was established as part of overall control of a larger project, there have been positive benefits concerning communications and raising safety awareness. A further feature is the evidence of a team spirit amongst a multi-employer group and breaking down of barriers that can develop in such situations. We consider that there is much to be learned from this example and have encouraged UKAEA to extend the approach to other areas and sites. A similar structured approach was observed concerning the arrangements for safety walkabouts and feedback across UKAEA’s Windscale site. These provide good examples of safety culture improvement programmes.

**Skills, recruitment and training**

129 The identification of core skills and competences, and the appropriate recruitment and training of staff required to fulfil safety related duties was again examined. One of the issues central to the Safety Audit was whether UKAEA, as a nuclear licensee, had within its own organisation the necessary core skills and competences to act as an intelligent customer for services provided by contractors.

130 NII is pleased to note that UKAEA’s use of a Human Resources Information System to cover all UKAEA posts at their sites, including recruitment and succession plans, is in place. A key step forward has been the recruitment strategy, which has demonstrated that UKAEA intends to move forward and is conscious of the need to examine its skill requirements corporately and on a site-by-site basis, and to use this information to target recruitment. More recently, developments to establish how best to identify and supply engineering resource to further UKAEA’s mission are a welcome step forward. Greater emphasis has been placed on competence requirements and associated training for persons who hold safety related posts. Some examples were found where this is being extended to cover posts held by contractors, to the extent that in some instances UKAEA was retaining direct control of the competences for such posts and placing a contractual obligation for compliance.

**Safety awareness and learning**

131 We chose this topic because of the all-pervading importance of a positive safety culture for maintaining and developing high standards of health and safety on nuclear licensed sites.
We found several initiatives to improve safety awareness and learning. Following the audit, UKAEA set up a project to study approaches for the development and maintenance of safety culture. This presented a comprehensive review of areas of good practice, and it highlighted where improvements are desirable and how an overarching strategy could be developed. This has been taken forward as a centre driven initiative to improve safety culture.

UKAEA is corporately seeking to improve its capability as a ‘learning organisation’. We support the view for reasons of efficiency and to promote consistent practice.

**Radioactive waste management**

It is our policy that radioactive wastes must be treated, packaged and stored in a passively safe state. Additionally, radioactive waste inventories should be identified and strategies for managing radioactive waste established.

We found that radioactive waste strategies existed across all UKAEA’s other sites, with good evidence that waste streams had been identified. Dependencies on other organisations were identified along with timescales and contingencies. Particular examples include the minimisation of waste by supercompaction at Winfrith and the introduction of working instructions on volume reduction at Windscale. Similarly at Harwell there is good information on waste types and inventory. These examples show that UKAEA is taking radioactive waste minimisation seriously and actively looking at the best methods for waste reduction.

**Maintenance**

UKAEA was currently in the process of introducing a new maintenance management system known as ‘Mainsaver’. This initiative is welcomed. There has been good co-operation at, and between, sites, and we believe that this should help to promote greater quality and consistency of maintenance. Dounreay has led on this issue and which has been progressed uniformly and enthusiastically across all sites. UKAEA has set up cross-site user groups, involving its tenants and contractors. The aim is to introduce improvements. This initiative is also helping to improve safety culture, ownership of the systems, and communication.

**Other issues - control of contractors**

We found evidence of positive developments in the control of contractors, particularly with respect to the development of contract specifications, requirements of contractors and subsequent implementation of the contract. A good example is the Winfrith Operations, Maintenance and Decommissioning (WOMAD) contract specification. More recently, the developments have included specific provision for UKAEA to exercise control over key safety related posts held by contractors. UKAEA has also demonstrated that it has put in place arrangements to ensure that contractors are selected with the skills and experience appropriate to the task. Several examples of control of the selection process were seen which included, in some cases, specification of the competences required.
UKAEA has also recognised that there is a need to examine its mission and how it is discharged through the efforts of its staff. Part of this examination has included identification of corporate expertise. Where this expertise cannot be provided in-house and a contractor is required, the requirements are specified in the tender and monitored throughout the project life. This philosophy is helping to ensure that contractors understand the customer’s expectations, and is improving the monitoring of delivery.

**Role of UKAEA’s Internal Inspection Department (IID)**

A strong and credible Internal Inspection Department is an essential requirement for good safety management. At the time of the audit, NII was aware that plans were being introduced to strengthen IID and, since the audit, UKAEA has successfully recruited new inspectors and reorganised its corporate inspection activities.

IID operates within UKAEA’s Safety, Health and Environment Division and is its internal regulator. IID is independent of UKAEA’s day-to-day operations. Essentially its role is to check that UKAEA is applying the correct standards, and this entails both proactive and reactive monitoring.

IID inspectors became involved at an early stage in UKAEA’s wider response to the audit. They have reviewed the status of all audit recommendations at each site, keeping a full record of progress, and have reviewed site-based evidence for each recommendation and provided a view on the adequacy of the justification for the close out of recommendations. UKAEA was not able to formally close out a recommendation until IID has made such a judgement and completed the records accordingly.

Therefore, the role of IID in the audit close-out process was to provide an independent scrutiny of the evidence. This role proved to be very valuable, since NII reviewed the evidence in support of close out for several audit recommendations and significance was attached to the judgements which IID had made. IID’s records were clear and auditable, and we have no disagreements on the current status of recommendations at the time of the enhanced inspections.

**Environmental issues**

This report has already made clear that the Safety Audit of Dounreay examined both environmental and health and safety issues, and was undertaken jointly by SEPA and HSE. Because UKAEA’s other sites are all in England, where the Environment Agency (EA) is the appropriate regulator for such environmental matters, SEPA has no jurisdiction. NII therefore consulted the EA about the UKAEA’s response, and has kept EA fully informed during the process of preparing this report. EA has confirmed that there are no issues of significance to them in respect of the close out of the audit for the UKAEA other sites. The EA was present at some of the final inspections.
4 CONCLUSIONS

144 UKAEA has carried out a significant amount of work over the last three years in addressing the requirements of the audit recommendations. However, there remains a lot of work which needs to be done by UKAEA in developing and implementing the revised corporate and site specific management systems. The completion of this work will be fundamental to the future decommissioning and restoration of the Dounreay site.

145 The audit of the management of safety at Dounreay by HSE and SEPA resulted in 143 recommendations for improvement in a number of areas. UKAEA responded by publishing its Action Plan describing how the recommendations were to be addressed. The significant amount of work carried out by UKAEA over the past 3 years, together with dialogue with NII and SEPA has resulted in the successful close out of 89 recommendations scheduled to be completed within this timescale. Progress in implementing a further 27 recommendations will be monitored in the medium term, i.e. the next five years, and the remaining 27 recommendations will be monitored over a much longer timescale, i.e. many decades.

146 The changes which UKAEA has put in place to meet the requirements of those recommendations concerned with the management and organisation of UKAEA’s activities should result in improvements in its safety and environmental management systems, if the new procedures are implemented. These procedures should enable UKAEA to demonstrate better control of its operations at its sites, principally by means of management systems.

147 We welcome the production of the DSRP and recognise the good work which UKAEA has done to produce the integrated overarching plan within a demanding timescale. The plans will however need further development, integration, and the incorporation of new data as and when this becomes available.

148 The project timescales presented in the DSRP programme are generally considered to form a credible programme for the decommissioning of the Dounreay site. There are several important projects for which we would welcome a further acceleration of the timescales if reasonably practicable. These are: the Vitrification Plant, shaft waste retrieval, the WTP for solid ILW, and ADU floc conditioning.

149 The DSRP identifies a vast programme of work, which will be particularly intensive in the first 10-15 years. We are aware that UKAEA’s funding for decommissioning at Dounreay was considerably increased by DTI in the last Whitehall Spending Round. For the DSRP to remain on track will require the long term commitment of financial resources to meet these Government-owned liabilities.

150 The DSRP remains dependent on a number of significant decisions which have still to be made, including those associated with the fuels treatment strategy. UKAEA will need to modify the DSRP and programmes once such decisions are made.
151 The DSRP programme is subject to a number of project risks, some of which are not wholly within UKAEA’s control, which may significantly change the programme dates. We therefore welcome UKAEA’s intention that the DSRP will be a living document which will be reviewed and developed in the light of experience.

152 UKAEA has been proactive in ensuring that the lessons from the Safety Audit of Dounreay have been considered against its other sites and progress has been made with appropriate improvements to its facilities and systems.
REFERENCES


5 Dounreay Site Restoration Plan (http://www.ukaea.org.uk/oindex.htm)

6 Making The Right Choice (http://www.ukaea.org.uk/sites/doptions/contents.htm)


10 International Safety Rating System Det Norsk Veritas (http://www.dnv.com)
UKAEA’s response to the audit was to allocate the 143 recommendations into six theme groups, to enable these to be addressed by common approaches and solutions.

| 1 | Management and Organisation |
| 2 | Human Resources and Training |
| 3 | Operational Strategy |
| 4 | Safety cases |
| 5 | Safety Management System |
| 6 | Safety Culture |

The Operational Strategy theme group was further sub-divided to address fuels, decommissioning and waste issues.

Of the 143 audit recommendations, 89 have been fully closed out. For these, UKAEA has provided adequate evidence to demonstrate that the requirements of the recommendations have been fully met. UKAEA’s applications in support of the close out of recommendations has been subject to independent confirmation by UKAEA’s Internal Inspection Department and on-site inspection by NII and SEPA.

The work associated with 27 recommendations will still take several years to complete, therefore, these been placed on a medium term programme. The work which UKAEA still needs to carry out associated with the recommendations on the medium term programme will be monitored as part of our routine regulatory activities.

UKAEA produced the Dounreay Site Restoration Plan (DSRP) to address 27 recommendations which are strategic in nature and, consequently, have very long timescales associated with their completion, in some cases extending to several decades. UKAEA’s progress in achieving key milestones on the programmes derived from the DSRP will be via the formal regulation of major projects. Additionally, annual progress meetings will be held between UKAEA and its regulators to ensure that the overall project timescales are being achieved.

The current status of the 143 recommendations, i.e. whether they have been closed or allocated to a medium term programme or strategic programme is summarised in Tables 1, 2 and 3 respectively. The colour coding of the recommendations, given in the key above, indicates the theme group in which they were allocated.
UKAEA should ensure that it has clear procedures for complying with the Construction (Design and Management) Regulations 1994, and ensure staff follow these procedures.

UKAEA should develop general and local strategies for controlling and managing implementation contracts. These control strategies should be documented, formalised, implemented and monitored.

UKAEA should review its procedures and instructions for the safe use and control of all types of contractor on the site. These instructions should clearly define the posts which are not appropriate for contractors.

UKAEA should re-evaluate its need for staff to produce technical contract specifications and take steps to ensure that sufficient, competent people are dedicated to this work.

UKAEA should develop or modify project strategies and procedures to support the policy and guidance.

UKAEA should develop and implement its proposed integrated auditing system for safety, quality, and environmental matters in the nuclear industry.

UKAEA should develop further its arrangements for contractor selection. Particular emphasis should be placed on the arrangements for control of sub-contractors, the maintenance of contractor and vendor performance databases and preferred supplier lists, taking account of the contractors' safety performance.

UKAEA should investigate the possibility of a condition of contract which would discourage or penalise the consortium from transferring identified key safety staff out of Dounreay Operations.

UKAEA should ensure that its records of attendance at training courses, on-the-job training and other developmental activities are comprehensive, maintained, and readily accessible.

UKAEA should complete the implementation of the recommendations of the Dounreay Management Team Review and in doing so perform a proper analysis of its present and future workload with the aim of ensuring that sufficient suitably qualified and experienced UKAEA staff are employed within the Dounreay Operations management team.

UKAEA should continue, subject to the findings of this audit, to develop, resource and implement its Safety Improvement Programme.

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UKAEA senior managers should develop and work to programmes of site and plant safety visits and hold informal discussions with staff.

UKAEA should continue to develop and implement measures to improve safety culture at Dounreay.

UKAEA should ensure that its managers carry out safety performance monitoring within their area of responsibility.

UKAEA should develop and implement arrangements to support a proactive approach to learning about good modern safety standards and practice from other licensees and other industries.

UKAEA should ensure that its internal procedures for the safe use and control of all types of contractor on the site are adequate.

UKAEA should ensure that it has clear procedures for complying with the Construction (Design and Management) Regulations 1994, and ensure staff follow these procedures.

TABLE 1 - AUDIT RECOMMENDATIONS ALREADY CLOSED OUT

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UKAEA should develop its arrangements to ensure that Site Shift Managers can provide an effective initial response to incidents or emergencies on all parts of the site.

UKAEA should continue to develop its arrangements to ensure that all staff with responsibility in an emergency are properly trained.

UKAEA should ensure that sufficient contracts are in place to provide an adequate resource for an effective and efficient response to incidents and emergencies.

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<tr>
<td>35</td>
<td>UKAEA should formalise a project interface management plan which covers major service contracts (eg the Facilities Management Contract), and its sub-contractors. This plan should be implemented as soon as reasonably practicable, and sufficient, competent UKAEA staff should be put in place to service this role.</td>
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<td>UKAEA should review its need for in-house specialists so that it is capable of acting as an intelligent customer for work provided by others.</td>
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<td>37</td>
<td>UKAEA should ensure that its own safety standards and culture are followed throughout the site.</td>
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<tr>
<td>38</td>
<td>UKAEA should ensure that adequate safety principles, design standards, and codes of practice are in place, and that project staff are made aware of those which are to be applied.</td>
</tr>
<tr>
<td>41</td>
<td>UKAEA should involve staff at a range of levels in learning about modern nuclear chemical plant practice and standards.</td>
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<td>43</td>
<td>UKAEA should change its decommissioning policy to promote decommissioning as soon as reasonably practicable.</td>
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<td>44</td>
<td>UKAEA should discuss with DTI the use of a discount rate lower than 6% with the aim of achieving earlier decommissioning where reasonably practical.</td>
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<td>45</td>
<td>UKAEA should develop an integrated decommissioning strategy for Dounreay.</td>
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<td>54</td>
<td>UKAEA should carry out the necessary Post-Operational Clean Out and decommissioning to allow DMTR to be brought into a similar state to the materials test reactors at Harwell.</td>
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<td>60</td>
<td>UKAEA should ensure that the decontamination and demolition of building D8550 and the PUMA facility are carried out to its programme.</td>
</tr>
<tr>
<td>63</td>
<td>UKAEA should produce and implement programmes for the Post-Operational Clean Out, decommissioning, and dismantling of all of Dounreay's redundant facilities as soon as is reasonably practicable.</td>
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<tr>
<td>64</td>
<td>UKAEA should justify periods of care and maintenance on the basis of a clear safety benefit, and develop safety cases for any plant in care and maintenance.</td>
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<td>UKAEA should develop a strategy to ensure that all services and facilities which will be needed during the dismantling of the plant will be available and operable when required.</td>
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<td>UKAEA should revise its Corporate Safety Instruction on radioactive waste management to align it with modern practice and in particular to require a strategic approach.</td>
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<td>67</td>
<td>UKAEA should ensure that the staff complement of the Waste Management Group is brought up to an adequate level as a matter of urgency and expanded as necessary.</td>
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<td>68</td>
<td>UKAEA as a matter of urgency, should complete a detailed inventory of all current wastes on site, incorporating estimates of wastes which will arise from decommissioning.</td>
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<td>69</td>
<td>UKAEA should develop a strategic plan for handling, treatment, storage, and disposal of all radioactive wastes on site, integrated with the plans for operation, Post-Operational Clean Out, care and maintenance and decommissioning.</td>
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<td>76</td>
<td>UKAEA should improve its quality assurance arrangements for plutonium contaminated and other wastes.</td>
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<td>78</td>
<td>UKAEA, as a matter of urgency should institute effective waste minimisation and volume reduction measures for low level waste.</td>
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<tr>
<td>82</td>
<td>UKAEA should improve its coordination of emergency arrangements at Dounreay to ensure that all plants have consistent plans and procedures.</td>
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<td>UKAEA should continue to develop its arrangements to ensure that emergency manuals and instructions provide clear guidance and instructions for those in positions of responsibility.</td>
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<td>UKAEA should continue to develop and operate its arrangements to ensure that emergency manuals and instructions are updated to align with current plant conditions, as part of plant modification procedures.</td>
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<td>85</td>
<td>UKAEA, as a matter of urgency should continue to develop and implement a comprehensive emergency exercise programme.</td>
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<td>86</td>
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UKAEA, as a matter of urgency, should take action to improve deficiencies in the filter arrangements in D9867 ventilation system. This should be carried out independently of any wider review and improvements to ventilation systems.

TABLE 1 - AUDIT RECOMMENDATIONS ALREADY CLOSED OUT

| 90 | UKAEA should improve its arrangements for reporting incidents to NII, particularly during silent hours, with the aim of bringing its practice into line with that of other licensees. |
| 91 | UKAEA should improve its arrangements for obtaining and learning from relevant information on nuclear events, incidents, and accidents occurring outside the UK. |
| 97 | UKAEA should cease the practice of sub-dividing modifications |
| 98 | UKAEA, as a matter of urgency should review and revise where necessary the safety category ascribed to current modifications and satisfy itself that previous under-categorisation has not led to significant safety concerns. |
| 100 | UKAEA should review maintenance across the Fuel Cycle Area to identify and promote best practice and improve standards of maintenance. |
| 101 | UKAEA should ensure that safety related maintenance methods, standards, and records are consistent across the site. |
| 103 | UKAEA should ensure that it adopts a systematic approach to goal setting legislation. |
| 104 | UKAEA should develop comprehensive systems for general health surveillance |
| 105 | UKAEA should continue to develop its drug policy |
| 106 | UKAEA should ensure that adequate radiological protection advice is available to meet the demands of the site |
| 107 | UKAEA should provide a health physics monitoring service to staff working in high hazard radioactive contamination areas rather than relying on self-monitoring. |
| 108 | UKAEA should ensure that sufficient Health Physics Surveyors are available to meet all of the demands on their specialist services. |
| 109 | UKAEA should issue practical guidance and instructions on control of contamination particularly for working with pressurised/air fed suits, the use of tents, gloveboxes, and fume cupboards. |
| 110 | UKAEA should remove existing radioactive contamination hot-spots where reasonably practicable and ensure that new contamination is removed as soon as possible after it is detected. |
| 111 | UKAEA should review the equipment and arrangements for personnel monitoring at contamination zone boundaries and at the point of exit from individual plants on the site to bring them into line with modern practice and standards. |
| 112 | UKAEA should install modern walk-through monitors with turnstiles at the exits of the main controlled areas on site. |
| 113 | UKAEA as a matter of urgency should implement a programme of routine earth testing for the whole of the electrical distribution system and should routinely prove the capability of safety related stand-by power by discharge testing the batteries. |
| 114 | UKAEA should review the operation of the Permit to Work system to ensure clearance of permits in a timely and effective manner. |
| 115 | UKAEA should install a new Guaranteed Interruptible Distribution system to supply safety related plant at the northern end of the FCA. |
| 116 | UKAEA should ensure that all necessary safety related equipment, including the ventilation system, is connected to GID system supplies. |
| 117 | UKAEA should analyse the response of the electrical system and its protection to a range of credible faults and carry out any necessary changes to ensure that, so far as is reasonably practicable, only faulty sections of the distribution system are disconnected when faults occur. |
| 122 | UKAEA should continue to develop and improve the monitoring strategy for fragments of irradiated fuel in intertidal areas near the site where there is public access. |
| 124 | UKAEA should verify and validate any computer systems used to support criticality control. |
| 130 | UKAEA should review the adequacy of the cell ventilation system in D2670, modify it as necessary, and demonstrate its performance through commissioning tests. |
| 132 | UKAEA should develop a strategy for dealing with the Mixed (Uranium and Plutonium) Oxide fuel stored in D2670. |
| 133 | UKAEA should either designate the uranium recovery rig in D2670 an experimental plant operating under close professional supervision with a defined closure date or re-engineer it for a production environment. |
| 136 | UKAEA as a matter of urgency should bring the condition DMTR up to normal work place standard |
| 137 | UKAEA, as a matter of urgency, should take action to improve deficiencies in the filter arrangements in D9867 ventilation system. This should be carried out independently of any wider review and improvements to ventilation systems. |
UKAEA should respond to the issues and recommendations raised in this report and provide a proposed action plan for discussion with the regulators before 30 November 1998.

| 138 | UKAEA should seek to avoid the use of ISO containers as temporary waste stores but where such use is unavoidable there should be more effective control of their contents and better management control of their use. |
| 139 | UKAEA should stop storing large contaminated items of radioactive waste in the open air. |
| 140 | UKAEA should review its policy on storage of non-UKAEA radioactive waste or material. |
| 141 | UKAEA, as a matter of urgency should review the adequacy of the current storage arrangements for contaminated sodium. |
| 142 | UKAEA should take action to segregate and store or dispose of the contaminated scrap metal at the east of the site. |
| 143 | UKAEA should respond to the issues and recommendations raised in this report and provide a proposed action plan for discussion with the regulators before 30 November 1998. |
UKAEA should submit a Preliminary Safety Report (PSR) reviewing options and defining the standards to which the equipment for the D2670 laboratory will be designed and constructed, prior to taking any action intended to lead to any routine fuel processing or reprocessing in that laboratory.

UKAEA should produce a robust safety case for D1208 in line with modern practice and implement a programme of improvements to ensure that the plant meets modern standards so far as is reasonably practicable.

UKAEA, as a matter of urgency should critically review the current condition of plant in D1208 and implement a programme of necessary improvements.

UKAEA should review the adequacy of the safety features on plant in D1234 and implement the improvements needed to bring it up to modern standards so far as is reasonably practicable.

UKAEA should give priority to the production of a complete and robust safety case for D1206 in line with modern standards, identify shortfalls, and propose reasonably practicable improvements.

UKAEA should provide explicit guidance on the proper safety categorisation of modifications and the procedures related to their management so that proper control, independent safety assessments, and regulatory oversight are routinely achieved.

UKAEA should update the Maintenance, Inspection and Test Schedules to reflect all the requirements of its revised safety cases.

UKAEA should ensure that document record arrangements are implemented and relevant records are sent to the document centres and the archive in accordance with procedures.

UKAEA should review the facilities and arrangements for the monitoring and reporting of airborne discharges and implement reasonably practicable improvements.

UKAEA should review its procedures for the design and verification of safety related computer software systems.

UKAEA should monitor compliance with the policy and guidance and review the adequacy of its arrangements accordingly.

UKAEA should review the adequacy of the technical support available to the operating plants in the FCA.

UKAEA should bring forward firm proposals for the reasonably practicable improvements needed for the safe operation and decommissioning of the FCA plants.

UKAEA should ensure that radioactive waste facilities comply with good engineering and waste management practice.

UKAEA should ensure that its safety cases are produced in a way which incorporates the needs of the owners and as such should ensure that they are clear and acceptable to plant staff.

UKAEA should increase resources to enable it to produce, assess, and revise its safety cases in a timely manner.

UKAEA should ensure that the periodic reviews of safety cases are up to date and that they compare the plant with modern standards, identify shortfalls, and propose reasonably practicable improvements.

UKAEA should ensure that radioactive waste facilities comply with good engineering and waste management practice.

UKAEA should review and analyse all active area ventilation systems and, where appropriate, bring the systems into line with modern practice so far as is reasonably practicable.

UKAEA should review the facilities and arrangements for the monitoring and reporting of airborne discharges and implement reasonably practicable improvements.

UKAEA should review its long term staffing and succession needs and it should set up recruitment programmes so that the appropriate technical, managerial, and supervisory staff are available to meet its safety obligations.

UKAEA should review and adapt all active area ventilation systems and, where appropriate, bring the systems into line with modern practice so far as is reasonably practicable.

UKAEA should monitor compliance with the policy and guidance and review the adequacy of its arrangements accordingly.

UKAEA should review its long term staffing and succession needs and it should set up recruitment programmes so that the appropriate technical, managerial, and supervisory staff are available to meet its safety obligations.

UKAEA should review and adapt the Maintenance, Inspection and Test Schedules to reflect all the requirements of its revised safety cases.

UKAEA should ensure that document record arrangements are implemented and relevant records are sent to the document centres and the archive in accordance with procedures.

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UKAEA should review and adapt the Maintenance, Inspection and Test Schedules to reflect all the requirements of its revised safety cases.

UKAEA should ensure that document record arrangements are implemented and relevant records are sent to the document centres and the archive in accordance with procedures.
| 39 | The UKAEA should produce and implement clear proposals for the processing, reprocessing or other treatment of all fuels on site and other outstanding commitments. |
| 46 | UKAEA should establish a clear strategy and plan for the safe management of all types of PFR fuel. |
| 47 | UKAEA should establish a clear strategy and plan for the safe treatment and disposal of boron carbide absorber rods. |
| 48 | UKAEA should continue the development of a method for the safe removal, treatment and clean-up of all sodium coolant in PFR. |
| 49 | UKAEA should carry out timely Post-Operational Clean Out and decommissioning work on PFR and associated plant with the presumption that long term care and maintenance is only tolerable where there is a clear safety benefit. |
| 50 | UKAEA should remove the DFR breeder elements as soon as is reasonably practicable and ensure they reach Sellafield before BNFL's Magnox Reprocessing Plant closes, or define an alternative method of treating this fuel. |
| 51 | UKAEA should vigorously pursue its development of a method for the safe removal, treatment, and clean-up of all sodium/potassium coolant in DFR. |
| 52 | UKAEA should ensure that an adequate plant infrastructure is in place for decommissioning (DFR). |
| 53 | UKAEA should carry out timely Post-Operational Clean Out and decommissioning work on DFR and associated plant with the presumption that long term care and maintenance is only tolerable where there is a clear safety benefit. |
| 55 | UKAEA should remove the radioactive materials from redundant laboratories in the Fuel Cycle Area and decontaminate them as soon as is reasonably practicable, giving priority to Laboratory 33. |
| 56 | UKAEA, as a matter of urgency should carry out Post-Operational Clean Out of the facilities in the amber area of D1203 and decommission the facilities as soon as is reasonably practicable. |
| 57 | UKAEA should decommission D1204 as soon as is reasonably practicable giving priority to the pond. |
| 58 | UKAEA should carry out Post-Operational Clean Out and decontaminate the cells in D1217 and complete its decommissioning study and implement it as soon as is reasonably practicable. |
| 59 | UKAEA should remove operational wastes from all cells and facilities within the Fuel Cycle Area as soon as is reasonably practicable. |
| 60 | UKAEA should make and implement plans to empty the Shaft as soon as is reasonably practicable. |
| 61 | UKAEA should empty the Wet Silo as soon as is reasonably practicable and not wait for the Shaft to be emptied. |
| 62 | UKAEA should review its strategy for the safe and timely vitrification of highly active waste. |
| 63 | UKAEA should develop and implement methods for the treatment and disposal of contaminated oils and solvents. |
| 64 | UKAEA should improve waste handling facilities at Dounreay to support the early decommissioning activities at site. |
| 65 | UKAEA should build a new import/export facility onto the Dounreay Cementation Plant Store. |
| 66 | UKAEA should plan for additional handling and storage capacity for plutonium contaminated wastes arising from decommissioning and develop a practical strategy for these wastes. |
| 67 | UKAEA should bring forward the construction of a versatile intermediate level waste treatment plant and associated waste stores. |
| 68 | UKAEA, as a matter of urgency should either install a new incinerator for combustible low level waste or find alternative methods for treatment, storage and disposal of these wastes. |
| 69 | UKAEA, as a matter of urgency should review its capabilities and options for the storage and disposal of Low Level Waste. |
| 70 | UKAEA should develop and implement a strategy for the treatment and disposal of 'very low radioactive material'. |
| 71 | UKAEA should remove all waste materials from the shielded cells in D2670, giving priority to the dissolved Prototype Fast Reactor Fuel. |
| 72 | UKAEA should, as a preliminary to Post-Operational Clean Out and decommissioning of DFR, review the condition of the building and its services and carry out any necessary remedial work. |
APPENDIX

R1 UKAEA should revise its safety and environmental management systems to be in line with modern practice.

This recommendation required UKAEA to improve its corporate management documentation and is linked to Recommendation 7 which required the rationalisation of lower level documentation. A key issue was for UKAEA to achieve a clear integration between corporate systems and local working practices.

At the time of the audit it was considered that UKAEA’s corporate safety management system provided a reasonable framework for complying with a range of health and safety legislation, including the requirements of the nuclear site licence. However, this was not sufficiently comprehensive to define a modern safety or environmental management system.

UKAEA has carried out a significant amount of work to address this recommendation and has undertaken a major review of its former Corporate Safety Instructions which have been replaced by UKAEA Safety, Health and Environment Procedures (USEPs). Additionally, these documents are all available in electronic format on UKAEA’s Intranet which allows users to gain immediate access to related documents and guidance.

UKAEA’s intention is to ensure that the USEPs provide a statement of the mandatory requirements laid down in safety and environmental legislation. UKAEA has produced Licence Condition Compliance Summaries to define the arrangements which they have put in place to meet the requirements of the nuclear site licence. These arrangements, which include UKAEA Divisional Systems manuals, UKAEA procedures, site specific procedures and plant operational documents such as operator and maintenance instructions, define the management systems by which UKAEA is regulated and inspected.

Clearly, the satisfactory completion of the requirements of this recommendation is fundamental to the future decommissioning and restoration of the Dounreay site to cover safety, environment and quality issues. We recognise the amount of work which UKAEA has done in response to this recommendation. However, in our view it needs further development, particularly with respect to integration of local procedures and corporate requirements.

UKAEA has stated that it expects the requirements of this recommendation to be met in the near future. However, we wish to see evidence to confirm the proper operation of the management system and consider that this will take longer than UKAEA originally envisaged. UKAEA has therefore included this recommendation as part of the future programme of work which we will continue to monitor in the medium term programme.
R2 UKAEA should ensure that the Internal Regulation Department is adequately staffed, supported and is developed in line with practices used elsewhere in the nuclear industry.

A strong and credible Internal Regulation Department (now called the Internal Inspection Department ‘IID’) is an essential requirement for good safety management. Whilst we were aware that plans were being introduced to strengthen IID, this recommendation reflected the need to ‘push on’ with these plans.

UKAEA has bench-marked the role of IID with other similar organisations, and has reorganised the Corporate and site-based structure. IID has successfully recruited new Inspectors at Dounreay (and other sites), and reorganised its Corporate Inspection activities.

UKAEA recognise that IID will need further development and their commitment to this is evident. However, UKAEA has met with the requirement of the audit recommendation and actions are ongoing to strengthen the numbers in IID. Monitoring of the performance of IID will be carried out by regular interactions with IID as part of our routine site inspection activities, joint inspections and gauging the quality of UKAEA’s safety submissions. This recommendation has therefore been closed out.

R3 UKAEA should review the role of the ATO holder to ensure that there are clear line management responsibilities for safety.

UKAEA has a system whereby certain staff are appointed to be responsible for the safety of particular plants. These members of staff are known as Authority to Operate (ATO) holders. The audit revealed that UKAEA’s appointment of ‘Authority to Operate’ (ATO) holders may not have been totally consistent with the accepted principle of maintaining clear lines of responsibility for safety. Placing responsibility for safety across a plant imposes onerous competence and resource demands on individual ATO holders. The audit required UKAEA to review this arrangement, consider the need for Duly Authorised Persons and clarify the management reporting routes.

UKAEA’s review identified three basic principles:

(i) the definition of safety responsibility must be clearly defined in the UKAEA’s safety & management procedures;
(ii) authority must be commensurate with responsibility;
(iii) support and service level must be understood between operators and support functions.

The above principles will be introduced as part of the management restructuring at Dounreay and which will be subject to a Management of Change plan, in accordance with UKAEA’s licence condition 36 arrangements.

Clear lines of management responsibilities for safety have been restated. Although, in the less complex facilities, the role of the ATO holder and his interactions are now
clear, this is less obvious for facilities which share services etc., for example in the Fuel Cycle Area. Also, issues such as the major restructuring of Dounreay, the responsibility for maintenance provision and the construction of new facilities will place continual challenges on UKAEA’s ATO holders.

We consider that the arrangements which UKAEA has put in place should ensure that the role of its ATO holders is adequately addressed and this recommendation can be closed out.

**R4 UKAEA should continue to develop its Nuclear Safety Committee and Safety Working Party system to ensure that its advisory role is clear.**

The Dounreay Nuclear Safety Committee (DNSC) provides formal advice to the site Director on significant nuclear safety issues. Underpinning the role of this committee, which is required by the site licence, are the Safety Working Parties (SWPs) which consider nuclear safety issues in more detail and report to the DNSC.

At the time of the audit, UKAEA had reviewed the working arrangements of its DNSC and SWPs to clarify their advisory role and the executive function of UKAEA and its managers. The audit report recognised the changes which UKAEA had introduced as an contribution to nuclear safety but required UKAEA to continue to develop the DNSC and SWP system to ensure that their advisory roles are clear.

Amongst some of the improvements which have been completed is a reinforcement of its arrangements to require the detailed technical safety arguments to be discussed at the SWP before being considered by the DNSC. This will now allow the DNSC to take a broader view of the safety arguments. At Dounreay, the SWPs have been reorganised so that they better reflect the management organisation, i.e. Decommissioning Group and Waste Management Group. The benefits of the revised safety committee structure and interactions should become evident in the quality of nuclear safety cases which will be submitted to NII for existing and future planned facilities.

Although this recommendation has been closed out, future assessment of UKAEA’s DNSC structure and responsibilities is an ongoing activity which will include re-approval of the arrangements under licence condition 13 ‘Nuclear Safety Committee’.

**R5 UKAEA should ensure that the role of safety representatives is clearly stated and adequately supported on all parts of the site.**

Safety representatives play a key role in enabling two-way communications between management and the work force on health and safety matters. Although these were considered to be working reasonably well within the Fuel Cycle Area, the working arrangements for safety representatives, and also the provisions of adequate resources to allow them to operate effectively and efficiently, were variable throughout the site. The arrangements also need to cover contractors’ safety representatives.
UKAEA has reviewed the effectiveness of the safety representative system and has introduced much improved consultation arrangements both for UKAEA and contractor Safety Representatives. Contractors are now required by their contract to make every effort to have Safety Representatives and UKAEA will finance some training and funds to attend relevant meetings. An introductory training workshop has been introduced for new Safety Representatives, and further training is available to representatives from both UKAEA and contractors.

Several discussions have been held between the Site Inspectors and the Safety Representatives on their role at Dounreay. The way in which UKAEA treats and makes provisions for Safety Representatives has clearly improved, and the need for Safety Representatives has been introduced into contracts for work at Dounreay.

It is our opinion that UKAEA has complied with the requirements of this audit recommendation, in that the role of Safety Representatives is now more consistent across the site; however, this consistency does not yet fully extend to all its contractors. UKAEA’s own Safety Representatives consider that the role of contractor’s safety representatives needs to be substantially improved: we support this view. This recommendation has been closed out; however, the obligations of UKAEA’s contractors to ensure that their safety representatives take an active role will be pursued as part of NII’s on site inspection activities.

R6 UKAEA should revise its Safety Performance Index to include positive aspects of safety performance

Our view at the time of the audit was that UKAEA paid bonuses if certain safety targets were achieved. However, these targets were considered to be based upon entirely negative aspects and were therefore undesirable.

UKAEA responded that positive aspects of safety performance were already monitored and reported within UKAEA’s management system, but not included in the incentive system. There are a number of positive safety measures that could be incorporated. However, it was UKAEA management’s responsibility to select those it considered to be appropriate. To enhance the existing system new positive measures were introduced into the Safety Performance Index:

- the fraction of recommendations from incident investigations closed out within the agreed timescale;
- the fraction of the declared programme of safety monitoring completed;
- the fraction of the declared programme of plant level emergency exercises completed.

We support the adoption of these measures.

We have sought assurance that the operation of the Safety Performance Index will be evaluated monthly through the Internal Inspection Department’s Safety Performance Review Group. We are now satisfied that this recommendation has been addressed and that it can be closed out.
R7 UKAEA as a matter of urgency should complete the rationalisation of the Dounreay safety documentation system to remove overlap and duplication and should reissue a comprehensive, user-friendly set of documentation.

Whilst Recommendation 1 primarily required UKAEA to review its corporate management systems, Recommendation 7 was aimed at the rationalisation of the lower tier site documents and procedures.

UKAEA has carried out a review of the totality of existing procedural and instructional arrangements to allow a rationalisation strategy to be determined. To establish a standard format for procedures and other associated documentation, facility managers and supervisors assisted in a programme of consultation to enable best practice to be determined. Templates have now been developed by UKAEA for a number of procedures and instructions which, if used properly, will allow consistency and rationalisation to be achieved across the site.

UKAEA set about introducing the common format of procedures and revising the documentation within a number of facilities within its Fuel Cycle Area to a defined programme. However, it was evident that this work should be directly linked to the introduction of modern safety cases, since a significant proportion of the necessary documentation, e.g. maintenance and operator instructions, was directly derived from the safety case for the facility. Therefore, in view of the fact that safety case production will carry on until 2005, UKAEA has stated that the final rationalisation of the documentation will not be completed until 2006, although existing documents which become due for periodic review during this period will be revised to be consistent with the new format. UKAEA intends to include the future rationalisation work as part of its medium term work programme.

UKAEA’s revised strategy is considered to be pragmatic and to some extent sets a sensible priority for the development of instructions that are linked to safety cases. We feel that UKAEA has made progress in this area, which has been particularly difficult owing to the large amount of legacy documentation and lack of central ownership which existed at the time of the audit. Therefore, we believe that the response to this recommendation should form part of the future work to be carried out as part of the medium term programme to be monitored as part of our routine site inspection.

R8 UKAEA should develop and implement its proposed integrated auditing system for safety, quality, and environmental matters and ensure it is adequately resourced.

The audit identified weaknesses including uncoordinated and unnecessarily duplicated audits and inspections. It was considered that UKAEA’s audits and inspections concentrated on checking that the paperwork was right rather than checking the adequacy of the system or process.

Since the audit, UKAEA has maintained its ISO9001 accreditation, and an improved programme of safety/environment/quality integrated auditing is in place and ongoing. The complement of UKAEA’s Audit Team has been increased and they
have been trained and deployed. The audit reports produced appear comprehensive with resulting actions being satisfactorily progressed. UKAEA has confirmed that the integrated audit process is fully implemented, is permanently staffed by Suitably Qualified and Experienced Personnel (SQEP) employed by UKAEA. The audit programme is largely up to date, the audit findings have been closed out in a timely manner, and the audit database used appropriately.

UKAEA has invested considerable effort in developing the arrangements for undertaking audits and these are considered to be adequate. However, UKAEA’s audit programme must be subject to continuous development in the future as more expertise and experience in safety and environmental matters becomes available. Nevertheless, we are satisfied with the progress UKAEA has made and the issue can be closed out. We will need periodically to review the output of these audits to ensure that the process is effective.

**R9 UKAEA should ensure that its managers carry out safety performance monitoring within their area of responsibility.**

The audit team felt that many actions arisings from UKAEA’s internal audits had not been followed up effectively. In addition to formal internal auditing, we considered it good practice for individual managers to monitor the performance of work in their area of responsibility. Whilst there was some evidence that individual managers were carrying out such monitoring, UKAEA accepted that these good practices were not sufficiently widespread. Therefore, the audit team considered that safety performance monitoring should be carried out on a more formal basis across the site.

Safety monitoring is now carried out extensively across the site by Group and Department Managers. The site business plan for Dounreay identifies three specific goals encompassing safety and environment performance improvements, organisational and personnel safety and training developments, and business targets linked to safety improvements in waste management, plant upgrades etc. The steps UKAEA has taken are appropriate and the issue can be closed out. The Dounreay Annual Review of Safety meeting between UKAEA and NII will offer a mechanism for UKAEA to report on its safety performance monitoring measures.

**R10 UKAEA should develop and implement arrangements to support a proactive approach to learning about good modern safety standards and practice from other licensees and other industries.**

Benchmarking and learning from others’ experience is considered good practice. Partly because of UKAEA’s specialist work programmes, and its remote geographically location, Dounreay had become increasingly insular.

UKAEA has continued in its commitment to learn from other licensees and other industries, including participation in Operational Safety Review Teams (OSARTs) organised by the International Atomic Energy Agency (IAEA). A number of site visits to other nuclear licensed sites have been made. Reciprocal arrangements have
been put in place by UKAEA to enable teams from other licensed sites to visit the facilities at Dounreay.

The main 'transfer' of experience has been between staff from UKAEA’s Fuel Cycle Area and staff at BNFL Sellafield facilities. Some exchanges have also taken place with the reactor staff at Hunterston. On balance, it is considered that UKAEA’s operations within its Fuel Cycle Area have most similarity with those carried out by BNFL at its Sellafield site; and these exchange arrangements have appeared to offer the most benefit. A number of BNFL’s operational facilities have been visited, covering fuel reprocessing, waste conditioning and storage and effluent treatment plants. The visits have been to both modern and old facilities.

From the details of site visits which have been undertaken, it is evident that a wide range of safety management issues have been covered including; permit to work and isolation procedures, adequacy of operational and maintenance procedures, arrangements for plant modifications and control of discharges etc.

Although UKAEA has met the requirements of this audit recommendation and it has been closed out, we will need to ensure that the exchange arrangements which have been put in place continue and that any improvements which are identified are considered for use within UKAEA’s own arrangements or management systems.

R11 UKAEA senior managers should develop and work to programmes of site and plant safety visits and hold informal discussions with staff.

Staff interviewed during the audit considered that senior managers were rarely seen on the plant. A number of senior managers agreed that they should spend more time on the plant in order to remain familiar with the plant and processes and conversant with staff.

We considered that this was important to demonstrate a senior manager commitment to good health and safety practice. This was one of a number of recommendations made by the audit team aimed at improving safety culture across the site.

To demonstrate the necessary management commitment an ongoing programme of senior and middle management site and plant safety tours was introduced by UKAEA. UKAEA has also introduced arrangements to ensure that any actions and concerns raised during plant safety visits are subsequently closed-out in an appropriate and timely manner and that any observed defects are prioritised. Formal arrangements have been put in place for managers to record observed defects. One criticism of management, raised by UKAEA staff during the audit, was that in carrying out these visits there was insufficient time for discussion. This aspect will be monitored as part of routine site inspection activities but, overall, we consider that this recommendation can be closed out.
R12 UKAEA should continue to develop and implement measures to improve safety culture at Dounreay.

UKAEA has introduced a number of initiatives at Dounreay to improve safety culture. Many have been advanced through the responses to other recommendations.

The following areas have been cited as evidence that UKAEA is continuing to develop and implement measures to improve safety culture including the work done to develop an effective Safety Management System (recommendation 1), commitments to radiological safety improvements (recommendations 111 & 112), development of internal standards and use of internationally recognised standards (recommendations 109 & 37), targets for safety performance and improvement (recommendation 6 & 78), clear roles and responsibilities (recommendation 3), planning, measuring, reviewing and auditing health and safety activities (recommendations 103, 13, 104, 105, 112, 8 & 2). Means of securing co-operation between individuals, safety representatives and groups (recommendation 5), external and internal communications (recommendation 11, 9 & 90) and the competences of individuals (recommendations 14, 18 & 21) have also been cited.

Other major initiatives, such as UKAEA’s accreditation to the International Safety Rating System (ISRS), are bringing benefits which contribute to meeting the overall requirements of the audit.

Taken together, these indicate the scope of measures and initiatives which UKAEA has undertaken which contribute to an improvement of safety culture at Dounreay. Whilst the improvement of safety culture will always be an ongoing commitment, we are satisfied that UKAEA has introduced a number of measures which should result in lasting improvements and the issue has been closed out.

R13 UKAEA should continue, subject to the findings of this audit, to develop, resource and implement its Safety Improvement Programme.

The audit found that UKAEA had in place a Safety Improvement Programme which addressed both technical and managerial issues such as policy, safety culture, training etc. Whilst we considered that the programme made a positive contribution to improving the safety management arrangements at Dounreay, it was felt that more effort should be put into this task.

UKAEA has reviewed the content of the safety improvement programme and it has confirmed that all of the actions previously included in the programme will be taken forward as part of its response to the overall audit recommendations. UKAEA has confirmed that all aspects of the safety improvement programme are addressed by the recommendation of the audit report.

UKAEA will review the content of the programme on an annual basis and prioritise further improvements on a prioritised basis. As this is, by its nature, an ongoing initiative, we are satisfied with this commitment and consider that the recommendation can be closed out.
R14 UKAEA as a matter of urgency should complete the task of identifying the core skills and competences needed to fulfil its safety-related duties and develop arrangements for this to be a continuous activity.

At the time of the NII audit, UKAEA was preparing a skills matrix in a number of areas including health physics advice, engineering, design and technical advice etc. UKAEA has since developed a list of safety related posts which provides details of skills, training, experience and qualifications required for each post. This is now held on the UKAEA Intranet as part of its management procedures which detail the arrangements for appointment and review of safety related posts and post holders. Requirements for periodic review of safety related posts, and the post-holders, are set out in, and tracked by a separate computer database.

Ownership of the list of safety related posts and the post profiles is held by the Head of Safety & Environment, whilst review of the overall arrangements is the responsibility of a newly formed executive group.

During our assessment of UKAEA’s close out submission, we questioned the completeness of post profiles and sought the extension of the arrangements being developed for safety related posts to other staff whose actions could affect safety. UKAEA have since recruited a training manager who has conducted a Training Needs Analysis for staff across the Dounreay site. A review of the post and training profiles for safety related posts (and gaps between competence requirements and competences held) is underway. A training manual has been developed, and converted into a site procedure, which captures the essential elements of a sound system for competence and training needs analysis.

UKAEA recognises that further work is required to ensure that its new arrangements are working and that individuals with safety roles are shown to have suitable competences, as compared against well-defined post (and training) profiles.

We are satisfied with the progress which UKAEA is making in this area; however, we welcome UKAEA’s decision not to apply for close-out of R14 at this stage. We will continue to monitor UKAEA’s progress in addressing these outstanding actions, and will seek a review which shows that Dounreay management are fully aware of the new training arrangements and that these are being implemented effectively. The recommendation has been placed on the medium term programme.

R15 UKAEA should establish its own appropriate and authoritative technical resources to be available to Dounreay to enable it to meet its safety duties.

The audit identified a need for UKAEA to put in place suitable and sufficient technical capability to be able to understand its own safety cases and to provide an authoritative source of guidance on engineering design standards, new designs and modifications etc. UKAEA has taken steps to address this recommendation by establishing a dedicated Engineering Group.

Evidence was sought from UKAEA that the technical resource provided for its Engineering Group was sufficient in terms of numbers of staff and their
competences. UKAEA intends to prepare a formal management of change plan in accordance with its licence condition 36 arrangements, which should substantiate the level of technical resource, but this has yet to be completed. Consequently there remains a need for UKAEA to demonstrate that the technical resource is suitable and sufficient. As part of the requirements of this recommendation, we also sought information from UKAEA as to how they proposed to secure an adequate intelligent customer capability in the area of human factors.

We will assess the formal management of change plan when this has been produced by UKAEA. Until an adequate plan has been produced, and implemented, by UKAEA it is proposed to keep this recommendation open as part of the medium term programme of improvements. UKAEA’s progress in completing the work associated with this recommendation will be monitored as part of the medium term programme.

With regard to our requirements for action to address shortfalls in human factors capabilities, UKAEA propose to extend human factors training to other staff at Dounreay. That proposal will need to be assessed in detail since we consider that UKAEA should have, within its organisation, a human-factors intelligent-customer capability and that UKAEA should take steps, corporately, to address this weakness.

R16 UKAEA should take steps to raise awareness and understanding of licensing requirements amongst its own and its contractors’ staff.

The audit identified shortcomings in the understanding of the nuclear regulatory system both within UKAEA itself and by its contractors. The knowledge displayed was weak compared to other licensees. In our view this lack of understanding would hamper UKAEA’s dealings with regulators.

To address this, UKAEA’s revised safety documentation includes a description of licensing requirements which is available to all staff on UKAEA’s intranet. UKAEA is also devising a programme of training to raise safety awareness and knowledge of licensing requirements amongst its own and contractors’ employees. Relevant licensing issues will be communicated to staff via established routes such as team talks.

To clarify the requirements of the thirty-six conditions of the NII nuclear site licence, UKAEA has carried out a series of presentations for its own employees and for contractors on the Dounreay site. Copies of the presentational material has been provided to NII as part of the justification in support of the close out of the recommendation. UKAEA has also stated that approaching 1000 people have attended this series of presentations.

Although all people working on a nuclear licensed site need to have an overview of the licensing requirements, the awareness of more senior personnel including managers and facility ATO (Authority To Operate) holders needs to be much greater. To achieve this, UKAEA arranged more specific presentations and these were jointly provided by UKAEA and NII.
Additionally, UKAEA has produced a nuclear site licence booklet which provides guidance for each of the licence condition. Taken together, UKAEA has met the requirements of this audit recommendation and it has been closed out.

**R17 UKAEA should review its long term staffing and succession needs and it should set up recruitment programmes so that the appropriate technical, managerial and supervisory staff are available to meet its safety obligations.**

UKAEA has experienced difficulties in recruiting sufficient suitable staff to work at Dounreay. The remote location of the site, competition from other employers and contractors in the nuclear industry and a perception that long term career prospects were poor were cited as contributory factors. In order to overcome these difficulties, UKAEA needed to develop a recruitment strategy to ensure that the long-term staffing needs of the site are identified and met.

UKAEA has introduced arrangements for succession planning to more senior posts, and this process is to be extended to include all safety related posts. UKAEA has also sought to enhance the numbers and range of competences available to Dounreay by a programme of recruitment. A corporate Human Resources (HR) Strategy has been produced which considers different initiatives to support the delivery of competent resource, such as management development training, graduate recruitment and the development of a supporting procedural infrastructure. UKAEA has recognised that further work is needed to fully address the requirements of R17 and to review the adequacy of the Dounreay succession planning arrangements. Therefore, this recommendation will be taken forward as part of the medium term programme of improvements and UKAEA's progress will be monitored by NII.

We also consider that UKAEA should develop its human resources strategy to include the following factors:

- To provide more transparent links between the resourcing strategies and the Dounreay Site Restoration Plan - i.e. to show how projected staffing needs over the first 10 years of the DSRP are consistent with the assumptions and approaches set out in the HR strategy.
- To set out a high level statement on the intended use of contractors in the DSRP. This statement has major implications for UKAEA’s recruitment of in-house resource, and the nature of that resource. Further assurance is needed that UKAEA has suitable plans to maintain an intelligent customer capability where use of contractors is envisaged.
- To provide more clarification on how UKAEA proposes to recruit suitable and sufficient personnel - especially over the first 10 years of the DSRP.
R18 UKAEA should develop and implement arrangements to ensure that the tasks involved in each safety related post are formally analysed and documented and that the qualifications and experience needed to work in such posts are properly identified.

NII expects licensees to identify clearly the qualifications and experience requirements for any posts that have the potential to affect safety. This applies to all levels of staff from operators to senior managers. Analysis of these requirements forms a basis for identifying suitable personnel and developing appropriate training programmes.

UKAEA has taken significant steps towards identifying the competence requirements of personnel with safety roles and recording these on its Human Resource Information System (HRIS) database. The database also contains data on each UKAEA staff member's qualifications and experience, so enabling managers to better match post requirements to individual personnel.

The identification, analysis and documentation of tasks involved in safety-related posts at Dounreay has progressed reasonably. UKAEA has now agreed to NII’s request to include a review of the adequacy and currency of these tasks in an annual review. We are satisfied with this position and consider that the recommendation can be closed out.

R19 UKAEA should develop and implement arrangements to ensure that staff occupying safety-related posts have or are acquiring suitable qualifications and experience.

During the audit, a number of post profiles were examined. Many of the post profiles did not set out the qualifications and experience needed for the post. Also, a number of job functions did not have a post profile. Therefore, UKAEA was unable to demonstrate that staff carrying out safety-related work were competent. The audit required UKAEA to analyse posts within its own and its contractors’ organisations to identify and document the necessary qualifications and experience.

In response to this recommendation, UKAEA’s Board endorsed a policy which formalised the requirements for becoming suitably qualified and experienced. UKAEA has identified the competences required for safety-related posts, and arrangements for analysing gaps between post requirements and post-holder competence are now in place. The Human Resources Information System allows managers to examine the competences of their staff against those needed for posts within their responsibility.

It is our opinion that UKAEA has taken significant steps towards ensuring that safety-related post-holders have suitable qualifications and experience and therefore the recommendation can be closed out. A procedure for carrying out Gap Analyses between post requirements and post-holders’ competences and experience has been produced. The provisions for ensuring that post-holders acquire suitable qualifications and experience have been bolstered by the recruitment of a training manager, and benchmarking exercises are being performed.
to provide confidence that Dounreay training arrangements take account of good practice in other organisations.

The adequacy of UKAEA's arrangements will be tested as the Site Restoration Programme develops because this will bring new roles and new personnel to the organisation. It is therefore important that these arrangements are robust, and we will monitor their use during normal regulatory activities.

**R20** UKAEA should complete training profiles for each safety-related post so that training and development needs are clearly identified, and develop arrangements for this to be a continuing activity.

The identification of training needs should be based upon an analysis of the competences needed to do the job, taking into consideration the skills and competences that staff already have. The audit required UKAEA to identify, in a systematic manner, the training and development needs for staff in safety-related posts.

UKAEA is ensuring that training profiles are identified for each safety-related post so that training and development needs are clearly identified, and developing arrangements for this to be a continuing activity.

We are satisfied with UKAEA's progress in developing training profiles for safety-related posts. In addition, we sought confirmation that UKAEA had taken steps to benchmark training quality and to monitor the effectiveness of training. UKAEA confirmed that benchmarking of the quality of training at Dounreay (using external organisations and standards) was factored into the role and responsibilities of the training manager. Arrangements to monitor the adequacy of training which affects work performance at Dounreay (therefore to include contractor and corporate training activities) have been developed. Overall, we consider that the recommendation can be closed out.

**R21** UKAEA should further develop its training programmes so that its own and contractors' staff undergo the training needed for safety-related posts.

The audit found positive examples of training at Dounreay, although variability in the quality of on-job training was observed. UKAEA has confirmed that, following the audit, there has been a move to ensure that safety-related post holders are UKAEA employees. They are therefore trained against the post profiles and training profiles covered under R14, R18 and R20. The suitability of contract staff is specified and controlled via the contractual arrangements with the contractor. We note that UKAEA is taking steps to improve the provision and documentation of on-job training, and we will continue to monitor progress in this area. UKAEA has also established provisions to monitor the delivery of training, which come under the remit of the new training manager. We are satisfied with UKAEA's progress and consider that this recommendation can be closed out.
R22 UKAEA should ensure that its records of attendance at training courses, on-the-job training and other developmental activities are comprehensive, maintained, and readily accessible.

The audit revealed that, although UKAEA kept training records for all UKAEA employees and some contractors, this did not include on the job training or developmental activities. The record system was not easy to use or up to date and was not readily accessible to line managers.

UKAEA introduced a management procedure which requires records to be made of attendance at courses and other developmental activities and course registers etc. For UKAEA staff, the procedure requires records of all training, including training given on-job. However, for contractors this is limited to the training provided by, or through, UKAEA. The safety training requirements for contractors were already covered by a Dounreay Procedure and this has been extended to include the requirement for recognised national certificates to demonstrate competency in, for example, excavations and scaffolding.

We are satisfied that UKAEA have put in place suitable measures to ensure that training records are held and maintained, and that they are readily accessible. The updated HRIS system (see R18) provides a means by which comprehensive training records can be maintained and accessed more easily. Procedures are now in place to require the maintenance of training data. The introduction of the "wallet" scheme for contractors, in which a summary of their training and competences is carried whilst on-site, provides an improved means of registering and monitoring the training and competences of non-UKAEA employees. There remains a need for UKAEA to ensure that on-job training is suitably captured on the HRIS database. We are satisfied that sufficient measures are in place to allow this recommendation to be closed out.

R23 UKAEA should investigate the possibility of a condition of contract which would discourage or penalise the consortium from transferring identified key safety staff out of Dounreay Operations.

Continuity of key personnel from the Management Support Contract (MSC) is of major importance to nuclear safety at Dounreay. At the time of the audit, it was clear that UKAEA had only limited control over the deployment of MSC staff, who could be transferred away from Dounreay without prior consultation.

The MSC has now finished. Key MSC personnel have been, or are being, recruited into the UKAEA organisation. The management of all nuclear facilities and safety-related work is now carried out by UKAEA personnel. These developments are welcome evidence that UKAEA is taking responsibility, within its own organisation, for managing matters which affect safety.

We also acknowledge that suitable measures have now been introduced by UKAEA to minimise the potential for contractors to withdraw key staff at short notice and this recommendation has been closed out. Although the specific concern to which Recommendation 23 related has largely been addressed by the transfer of most of
the senior or safety-related MSC staff into UKAEA, they have also responded positively to additional requests to ensure that these measures are applied to other contracts which supply staff who have a key safety role. This is a welcome development.

R24 UKAEA should complete the implementation of the recommendations of the Dounreay Management Team Review and in doing so perform a proper analysis of its present and future workload with the aim of ensuring that sufficient suitably qualified and experienced UKAEA staff are employed within the Dounreay Operations management team.

This recommendation was principally concerned with ensuring that a suitable Dounreay management structure is put in place, and that senior management posts at Dounreay are held by suitably qualified and experienced UKAEA personnel rather than contractors. Following the NII audit, UKAEA developed a strategy which set out a revised organisational structure designed to increase UKAEA’s management control of safety-related activities.

The Management Support Contract (MSC) has now finished, and UKAEA employees hold all the senior management posts. UKAEA has also taken steps to ensure that UKAEA personnel define and control engineering and technical standards by creating an Engineering Group, which acts as the company’s intelligent customer for externally procured services. We are satisfied that UKAEA’s strategy provides a sound basis for improved licensee control of safety at the Dounreay site, and that the key elements of that strategy have now been implemented. Also, the recommendations in the 1998 Dounreay Management Team review have been addressed, or have been superseded by later developments. The subject of this recommendation can therefore be closed out.

There remains a need to ensure that suitable and sufficient personnel continue to be employed within the Dounreay management organisation as the Site Restoration Plan is implemented. The human resources and training infrastructure which has been developed in response to the audit should promote the delivery of an appropriate resource. To this end, two of the human resources and training audit recommendations (R14 and R17) have been placed on the medium term programme, and NII will continue to monitor UKAEA’s progress against them.

R25 UKAEA should use its management of change procedures in making changes to the Dounreay Operations management team.

UKAEA’s new management of change procedures were introduced in January 1998 and these were used to implement the changes to its management team at Dounreay. Since the audit NII introduced licence condition 36 requiring all licensees to make and implement adequate arrangements for the Management of Change (MoC) and UKAEA set about reviewing its original arrangements to ensure that these met the requirements of the new licence condition.

Changes to the Dounreay Management Team, and to the wider organisational structure at Dounreay, were principally addressed under R24. R25 was intended to
ensure that changes were carried out in accordance with its MoC procedures. However, the new arrangements which have since been developed to meet the requirements of licence condition 36 have been separately assessed, i.e. independently from this audit recommendation.

We do not consider that UKAEA’s original change proposals were very well substantiated. However, it was considered that the changes were positive and do not have any significant potential to degrade safety: indeed, we raised no objections to them being implemented. These specific changes are regarded as a subset of the wider Dounreay Management Team changes concerned with recruitment and training which have largely taken place but for which a MoC justification has not yet been provided.

In our view, UKAEA should carry out a retrospective justification of the new Dounreay Division structure, using its new arrangements to demonstrate that the current structure is suitable and to ensure that the application of the MoC arrangements would not have revealed any potential problems.

UKAEA has reported that it has carried out such analysis but this has yet to be fully demonstrated to our satisfaction. However, UKAEA’s new management structure is in place and the justification for the existing structure may be considered as part of our future assessment of its revised LC36 arrangements and our routine regulatory activities. This recommendation has therefore been closed out.

R26 UKAEA should implement, and continue to develop its policy and guidance on the use and control of contractors.

A significant amount of work at Dounreay is carried out by contractors. It is important that UKAEA retains adequate control over work which can affect safety on the site, and that it has in place suitable measures to specify contracts and to manage and interpret the work of its contractors. To this end, UKAEA introduced a policy on the use and control of contractors in May 1998, together with guidance on how the policy should be implemented.

Although welcoming this policy, we found evidence to suggest that not all relevant personnel were fully aware of the policy or how to implement it.

UKAEA has now further developed the policy and guidance and sought to broaden staff awareness via training sessions, reviews and use of the intranet. We are satisfied that the policy and guidance form a sound basis for ensuring that an appropriate balance is achieved between the use of contractors and the retention of key safety functions within UKAEA’s own organisation. This recommendation has therefore been closed out.

R27 UKAEA should develop or modify project strategies and procedures to support the policy and guidance.

UKAEA’s policy and guidance on the use and control of contractors was issued in May 1998, and has since been applied to all new projects. A formal review of the
policy was completed in August 1999 and this resulted in a formal reissue of UKAEA’s policy and guidance in December 1999. UKAEA’s new Project Management Manual and its corporate guidelines on sanctioning of new work reference, and support the implementation of, the policy and guidance documents.

Evidence gathered during site inspection visits shows that work has been carried out to support the roll-out of the policy and guidance.

We are satisfied that UKAEA has taken suitable steps to meet the requirements of this recommendation to allow it to be closed out. However, continued monitoring of the application of the policy and guidance will continue as part of our consideration of Recommendation 28.

R28 UKAEA should monitor compliance with the policy and guidance and review the adequacy of its arrangements accordingly.

R28 is principally concerned with monitoring the adequacy with which UKAEA’s policy, and related procedures, on the selection and control of contractors are applied. As such, it involves an evaluation of the success with which the policy, guidance and other related procedures, as addressed by other audit recommendations, are implemented.

In examining the implementation of the policy and guidance, we sought evidence that UKAEA was monitoring the use of these documents and their effectiveness. We noted that a UKAEA review of procedures covering contractor health and safety selection and control has also been carried out, and that this has given rise to some recommendations for improvements to ensure that the procedures are used consistently.

Although good progress has been made, there is a need to keep R28 open until more experience has been gained in using the policy and guidance, and they have been shown to be implemented effectively. UKAEA has agreed to conduct a series of audits to ensure that the policy and guidance are fully absorbed into management processes and practice. Therefore, it is appropriate that UKAEA’s progress in meeting the requirements of this recommendation is considered as part of the medium term improvements programme.

R29 UKAEA should revise the contract strategy documents to ensure that safety is paramount.

The audit team judged that UKAEA had been concentrating on compliance with the EC Procurement Directive in its consideration of tenderers rather than other issues including UKAEA’s ability to continue to comply with the nuclear site licence and other safety legislation.

UKAEA reaffirmed that safety is a top priority for its operations, and this is now a key factor in UKAEA’s contract strategy. UKAEA ensures that all tenderers are fully capable of meeting safety standards before bids are evaluated against other criteria. UKAEA contract strategy is driven by the requirement of the nuclear site licence,
and UKAEA therefore ensures that other competitive contractual requirements do not conflict with the primary priorities of safety and licence compliance. The need for proper handover arrangements in the event of a change of contractor is now provided for in new contracts, and adequate time is allowed in the re-tendering process to achieve a smooth transition.

We are satisfied that UKAEA has made sound progress towards ensuring that safety is a key factor when placing and managing contracts so that the recommendation can be closed out. We also note that the adequacy of the contract strategy documents, and their application, will continue to be reviewed by UKAEA under R28 (the overarching recommendation for contract policy areas) and under R30 (vendor performance database).

R30 UKAEA should develop further its arrangements for contractor selection. Particular emphasis should be placed on the arrangements for control of sub-contractors, the maintenance of contractor and vendor performance databases and preferred supplier lists, taking account of the contractors’ safety performance.

The audit found that UKAEA did not exert control over the appointment of sub-contractors. Although a vendor/supplier database was being developed at the time of the audit, we considered that this should include sub-contractors, and that it should place more emphasis on its contractor performance and safety record.

Since the audit, UKAEA has introduced a new Supplier Information System Project (SISP) to gather, retain and provide information on contractor performance. Therefore, the recommendation can be closed out. We have not yet received evidence to demonstrate that this new system is effective, and that it supports the selection of contractors and sub-contractors with good safety performance. However, as part of routine site inspection activities we will obtain confirmation that recent contract selection processes have been reviewed and are shown to have drawn upon the supplier database.

R31 UKAEA should re-evaluate its need for staff to produce technical contract specifications and take steps to ensure that sufficient, competent people are dedicated to this work.

Contract specifications should specify all aspects of the work required including design standards, manufacturing standards, inspection services and the competences of staff etc. The audit showed that UKAEA had been having problems with the production of adequate specifications for fixed price contracts. The audit team was concerned that technical shortcomings could affect safety as a result of contractor cost savings to meet fixed price limits. These concerns did not provide a basis for confidence in the competence of those preparing contract specifications. UKAEA confirmed that a significant proportion of the staff with this expertise had been provided from departments which had been run down or divested.

UKAEA has now formed a new Engineering Group at Dounreay. The Engineering Group consists of three departments managing the design process. Two of these
departments (Design Services Department and Site Restoration Design Services) are concerned with managing the teams which carry out design and the third department, Standards Application and Interpretation Department (SAID) is intended to ensure consistent application and interpretation of Engineering Standards.

UKAEA has submitted staff charts to indicate the strengthening of its contract specification department. This recommendation is to a large extent covered by R15 and R24 and, on an ongoing basis, via its licence condition 36 Management of Change arrangements. We are satisfied that UKAEA has met the requirements of this recommendation to allow it to be closed out.

**R32 UKAEA should review its procedures and instructions for the safe use and control of all types of contractor on the site. These instructions should clearly define the posts which are not appropriate for contractors.**

At the time of the audit, there was one procedure which defined UKAEA’s arrangements for managing contractors. Within this procedure were stated definitions of the roles of staff with safety responsibilities. These procedures did not exclude the use of contractors in key safety related posts and it was evident that there were several instances where contractors held such posts. We considered this position to be unsatisfactory since filling such posts with contractors effectively transferred control of the activity to the contractor. However, at the time of the audit, UKAEA had recognised this deficiency and was bringing such posts back within UKAEA control.

UKAEA has now produced a listing of safety-related posts (in response to R14), and this listing now includes a clear statement as to whether the post must be held by a UKAEA employee. The policy on control of contractors provides a framework for ensuring that contractors are properly selected and managed on the site. UKAEA’s response to R33, which puts in place improved project management systems, further clarifies the roles and responsibilities of UKAEA staff and contractors and so tightens UKAEA’s control of contractors. This recommendation is also linked to recommendation 33 which defines how contractors are controlled and managed through project management systems. It is also directly linked to recommendation 34 which defines other control systems, for example, those necessary to comply with the Construction (Design and Management) Regulations. The measures which UKAEA have taken are sufficient to allow this recommendation to be closed.

**R33 UKAEA should develop general and local strategies for controlling and managing implementation contracts. These control strategies should be documented, formalised, implemented and monitored.**

Several implementation contracts inspected during the audit showed that project managers and engineers were invariably a mixture of UKAEA and contractors. In some instances, several layers of contractor were evident. The audit team was concerned about the level of control which was exercised by UKAEA over these extended chains. At the time of the audit, a control strategy document was being prepared and this recommendation was intended to reinforce the continued development of that strategy document.
UKAEA have since revised its Project Management Manual (PMM) to incorporate these new strategies. Of particular note is that all Project Managers and Project Supervisors should now be licensee staff. This is an important measure to ensure that UKAEA remains in control of projects. Additional staff have been recruited to fill vacancies, training courses have been held, and compliance audits have taken place. We have examined the Project Management Manual, and raised a number of points, all of which have been satisfactorily addressed by UKAEA and we consider that the recommendation can be closed out. Periodic sampling of the practical application of the PMM will be carried out as part of our normal regulatory activity.

**R34 UKAEA should ensure that it has clear procedures for complying with the Construction (Design and Management) Regulations 1994, and ensure staff follow these procedures.**

The Construction (Design and Management) Regulations 1994 (CDM) apply to many of the projects on the Dounreay site. Although UKAEA staff were generally aware of the requirements of the regulations, they were not always readily able to provide the legal documentation, for example, a Health and Safety Plan. There was also some confusion within some UKAEA project teams over who should hold certain duty holder posts under the regulations. UKAEA reported that at the time of the audit, procedures were in place to enable compliance with the CDM Regulations. However, there was some inconsistency in the implementation of these regulations across the Dounreay site.

In order to address this weakness, UKAEA has provided specific training to all Project Managers and Supervisors and new procedures have been introduced (CDM Regulations at Dounreay) which define the responsibilities and arrangements to enable compliance with the regulations. To ensure that staff are fully compliant with the regulations, UKAEA has appointed a Construction Safety Advisor to provide guidance to Project Managers on their responsibilities.

We have monitored the evolution of Dounreay's CDM procedures over the past 2 years and we now consider that they are fit for purpose such that the recommendation can be closed out.

**R35 UKAEA should formalise a project interface management plan which covers major service contracts (eg the Facilities Management Contract), and its sub-contractors. This plan should be implemented as soon as reasonably practicable, and sufficient, competent UKAEA staff should be put in place to service this role.**

The audit found that insufficient UKAEA staff were in place to supervise and control the interface between UKAEA and its service contractors. UKAEA had already acknowledged that its existing arrangements for managing service contracts were deficient, and was taking steps to improve them by developing project interface management plans. The audit recommendation sought a timely introduction of these plans, and confirmation that interfaces with the contractor were adequately controlled by a sufficient number of suitably qualified and experienced licensee staff.
Project management plans have been produced for a number of service contracts across site, including the Facilities Management Contract. However, organisational changes at Dounreay following the audit have led to changes to the way in which service contracts, such as those covering maintenance, are now managed. The primary responsibility for ensuring that maintenance contracts are appropriately managed rests with the newly created maintenance services department which is the subject of R101. Other aspects of the specification of contracts, and selection of contractor, are covered under R33 and R30. We are satisfied that UKAEA has established improved arrangements for the control of service contracts to allow this recommendation to be closed out.

R36 UKAEA should review its need for in-house specialists so that it is capable of acting as an intelligent customer for work provided by others.

This recommendation was concerned with UKAEA’s provision of sufficient in-house technical capability to act as intelligent customer for work performed by its contract resource. UKAEA has addressed this recommendation by establishing an Engineering Group (see R15) which serves as the licensee's principal source of technical expertise. There is also now greater provision for the intelligent customer capability within UKAEA’s arrangements for letting and managing contracts (see R26 to R33 and R35).

We are satisfied that UKAEA’s progress in dealing with these other audit recommendations effectively addresses the substance of R36 which can be closed out. Any outstanding issues will be covered under R15.

R37 UKAEA should ensure that its own safety standards and culture are followed throughout the site.

A key finding of the audit was that UKAEA should ensure that appropriate strategic decisions were being made and that, as a licensee, it was in day-to-day control of the site. An associated factor was that UKAEA should be setting the safety standards for all staff working on the site and be the main influence in developing the safety culture. Therefore, it was considered that UKAEA needed to ensure that it had sufficient influence throughout the site.

UKAEA recognises that, as licensee, it is responsible for the whole of the Dounreay site and through its safety improvement programme, UKAEA intends to develop its own safety culture and standards.

UKAEA’s contractors are expected to adopt UKAEA’s safety standards and procedures where appropriate. To achieve this, contractors’ involvement in the safety improvement programme is reinforced by regular meetings, briefings with principal contractors, the contractors safety forum, financial support for contractors safety representatives and participation in UKAEA safety culture training.

Since the audit, UKAEA has embarked upon a broad range of initiatives to develop its safety standards and culture on the site. These initiatives have been targeted at
both its own staff and its contractors’ employees and have included poster campaigns, safety road shows covering conventional and nuclear safety issues, lectures to provide feedback on the lessons learnt from incidents and monthly core safety briefs addressing issues such as COSHH, Personal Protective Equipment, fire safety, asbestos safety etc.

Taken together, UKAEA has demonstrated that it has tackled the requirements of this recommendation in a comprehensive and informative manner in an attempt to impose its own safety culture on to the site. This recommendation can therefore be closed out. We will, however, need to ensure that such activities continue, as part of normal activities on the site.

R38 UKAEA should ensure that adequate safety principles, design standards, and codes of practice are in place, and that project staff are made aware of those which are to be applied.

R38 is closely linked to R15 which is concerned with the provision of an authoritative technical resource within Dounreay. UKAEA has established a ‘Standards Application and Interpretation Department’ within the new Engineering Group, which has responsibility for standards specification and dissemination. A revised approach to the specification of designs (i.e. the design substantiation document, and reviews by the Design Services Department) provides more confidence that standards and codes of practice, etc., will be implemented.

We are satisfied that these organisational changes appear to establish a suitable structure for defining and implementing design standards, safety principles and codes of practice so that the recommendation can be closed out. The adequacy with which these arrangements are resourced, and implemented, is considered under R15.

R39 UKAEA should produce and implement clear proposals for the processing, reprocessing or other treatment of all fuels on site and other outstanding commitments

UKAEA responded to this recommendation in Volume 6 of the Dounreay Site Restoration Plan (DSRP). This Plan identifies options for the treatment of all Dounreay fuels. UKAEA has carried out significant work, not only to identify and collate information on the fuels, but also to develop options for the treatment of the material. UKAEA continues to develop its thinking across a broad range of options.

The UK government has recently determined that the reprocessing of the PFR fuels will not be carried out at Dounreay and that UKAEA should pursue other options to ensure the long-term safety of the fuels held on the site as part of the future development of the DSRP. This outcome will enable UKAEA to focus more clearly on these other options but some work has still to be done to determine the route to treat all fuels on site and other outstanding commitments.
This recommendation is therefore allocated to the strategic category as UKAEA’s proposal for the treatment of fuels will be included in future development of the DSRP

**R40** UKAEA should review the adequacy of the technical support available to the operating plants in the FCA.

There is a requirement for operators of nuclear plants to be involved in the production of safety cases for their facilities, since this promotes ownership and an understanding of the safety case. At the time of the audit, it was evident that the level of UKAEA technical support available to support the operating plants' safety cases was limited, and concerns were raised about the presentation of operating instructions.

Recruitment has now been carried out to increase the complement of professional and technical staff in the FCA. Technical support is now available through the Engineering Group, which has been established to provide an authoritative source of technical expertise (see R15).

Although UKAEA has addressed the issue of resource shortfalls, we consider that further work is needed to ensure that instructions are designed and presented in a form which is consistent with modern standards. UKAEA's progress towards developing suitable standards and implementing them across Dounreay will be monitored as part of their medium term improvement programme.

**R41** UKAEA should involve staff at a range of levels in learning about modern nuclear chemical plant practice and standards.

Benchmarking and learning from the experience of others is considered good practice. The audit team felt that, because of its specialist work programmes and its remote geographically location, Dounreay had become too insular.

In addressing the requirements of this recommendation, UKAEA has made use of existing teaming arrangements with BNFL and other UK licensees. Such teaming arrangements allows UKAEA to share knowledge and to gain experience in different working practices. Also, UKAEA has made use of a wide range of formal and informal contacts within UK and overseas nuclear industries. Teams of employees at various levels have visited different, but relevant, organisations, both in the UK and abroad. UKAEA has reported that information from these visits has been cascaded to relevant staff at Dounreay.

Although R10 required UKAEA to secure improved links with other nuclear licensees, to remove the self-referencing culture which had been established, the purpose of R41 was to ensure that any initiatives involving the exchange of staff was extended to include a broad range of staff to present them with the opportunity of appreciating the working methods of similar, but more modern, nuclear facilities.

UKAEA’s response has confirmed that the previous contacts which they had maintained, which were mainly at Site Director and senior management level, had
been extended to include staff at all levels. From an examination of the reports which have been provided to NII, covering the exchange visits, it is evident that staff at various levels have been involved in these formal exchange arrangements. We consider therefore that this recommendation can be closed out. As part of future inspection activities, UKAEA will need to demonstrate that the exchange arrangements on topics of shared interest continue between UKAEA and its UK and overseas contacts and that the information from such visits is adequately cascaded to as many people at Dounreay that could benefit.

**R42 UKAEA should bring forward firm proposals for the reasonably practicable improvements needed for the safe operation and decommissioning of the FCA plants.**

A number of diverse reports had identified that significant improvements were needed for the safe operation and decommissioning of the FCA plants. This recommendation, therefore, required UKAEA to bring forward firm proposals for reasonably practicable improvements.

The improvements which had been identified needed to be prioritised and implemented as part of plant start-ups or for future decommissioning. UKAEA established a plant improvement database compiled from internal and external inspections. However, the identification and implementation of the improvements will continue as part of an ongoing programme over many years, with the timescales commensurate with the strategic plan for the Dounreay site.

UKAEA has produced and implemented various procedures relating to the management of the database, for example, quality assurance procedures which are intended to ensure that items in the database cannot be removed without the appropriate level of management approval. Also, a Dounreay procedure has been introduced for the assessment of safety-related plant improvements. This defines five categories of improvement based on the classification for the implementation of modern standard safety cases which should ensure consistency. Arrangements have also been put in place for a periodic review of the database.

Implementation of the improvements has been variable across the FCA. Therefore, UKAEA’s progress in meeting the full requirements of the recommendation will be monitored as part of the medium term programme to ensure that adequate priority is given by UKAEA to the implementation of identified improvements.

**R43 UKAEA should change its decommissioning policy to promote decommissioning as soon as reasonably practicable.**

UKAEA has revised its decommissioning policy in response to this recommendation and the policy is published in the Dounreay Decommissioning Plan (Volume 3 of the DSRP) along with UKAEA’s internal guidance on applying the policy and the principles for decommissioning at Dounreay. Our views on the interpretation of UKAEA’s Corporate Policy at Dounreay, as reflected by the revised decommissioning timescales for the Dounreay site, are set down in Section 3 of this
This recommendation is considered to be closed out, however, we will consider UKAEA’s interpretation of their policy statement in relation to their other licensed sites as part of our Quinquennial Review of their decommissioning strategies.

R44 UKAEA should discuss with DTI the use of a discount rate lower than 6% with the aim of achieving earlier decommissioning where reasonably practicable.

We do not believe that the 6% discount rate is now the dominant factor determining the overall timescales in the accelerated decommissioning programme for the Dounreay site. We will consider the significance of the discount rate on the decommissioning timescales for facilities on UKAEA's other nuclear licensed sites, as part of our quinquennial review of the decommissioning strategies for those sites.

UKAEA’s current decommissioning timescales are defined in the programmes arising from the DSRP. Our views on the DSRP are discussed in detail in Section 3 and this recommendation has been closed out.

R45 UKAEA should develop an integrated decommissioning strategy for Dounreay

In response to this recommendation, UKAEA has produced the Dounreay Site Restoration Plan (DSRP). The Decommissioning Plan is contained in Volume 3 of the DSRP.

Our views on the DSRP are discussed in detail in Section 3 and this recommendation has been closed out.

R46 UKAEA should establish a clear strategy and plan for the safe management of all types of PFR fuel.

This recommendation is linked to R39.

Much of the unprocessed irradiated fuel remains in the irradiated fuel cave within the PFR building or inside fuel cans in the PFR storage pond. Reprocessing of this fuel has not been possible in the existing D1206 facilities because of the failure of the dissolver vessel. Additionally, there are some un-irradiated fuel elements stored within the new fuel cell of PFR and also a number of carbide fuel elements.

As stated in R39, the UK government has recently announced that the reprocessing of the PFR fuels will not be carried out at Dounreay. Therefore, UKAEA’s future safe management of PFR fuel will need to be considered as part of their overall proposals for the processing, reprocessing or other treatment of all fuels on site and other outstanding commitments, as required by R39.

R46 has therefore been allocated to the strategic category as UKAEA’s proposal for the treatment of fuels will be included in future developments of the DSRP.
UKAEA’s progress in establishing a strategy for the safe management of PFR fuel will be monitored via an appropriate programme arising from the DSRP.

R47 UKAEA should establish a clear strategy and plan for the safe treatment and disposal of boron carbide absorber rods.

The absorber rods in the PFR reactor core were removed in May 1999 and transferred to the PFR Irradiated Fuel Cave (IFC) for interim storage along with other absorber rods already in the cave. There are other absorber rods in the D1217 Remote Handling Facility and in the D8571 Post Irradiation Examination facility which will also be transferred to the PFR IFC. The absorber rods will undergo cleaning, size reduction and packaging in the PFR IFC and then will be transferred to the existing D9875 Remote Handled Intermediate Level Waste Store prior to transfer to the proposed Waste Treatment Plant (WTP) when available (see Recommendation R77). Then, after conditioning in the WTP, the conditioned PFR absorbers will be transferred to the proposed Conditioned Waste Store for long term storage pending the availability of a national ILW repository.

The treatment of absorber rods will take a number of years to complete and, therefore, this recommendation has been placed on the strategic category programme. Progress on this recommendation will be followed by our monitoring of an appropriate programme and formal regulation of PFR project work.

R48 UKAEA should continue the development of a method for the safe removal, treatment and clean-up of all sodium coolant in PFR.

The audit report noted that the removal and treatment of approximately 900 tonnes of sodium from the PFR reactor is currently the largest decommissioning project being undertaken on the Dounreay site. In its report Dounreay - The Way Ahead, UKAEA reported that active commissioning of the sodium disposal plant was expected to begin in May 1999, and that all of the bulk sodium should be removed by April 2002. There have been delays with this project owing to the need to obtain approval from the European Commission under Article 37 of the Euratom Treaty and technical problems during the commissioning phase. Inactive commissioning of the sodium disposal plant, using sodium stored in the original storage tanks has now been completed and active commissioning is now scheduled to start by the end of 2001 to allow the treatment of the bulk of the sodium in the reactor vessel.

In the audit report, concern was expressed at the slow rate of development of the Water Vapour Nitrogen Process for the removal of sodium residues from the internal reactor components. UKAEA completed small scale trials some time ago and a series of trials to prove the process at larger scale is now planned. The design and construction of a purpose built rig to develop a suitable process for the removal of residual sodium from the reactor is now underway.

In ‘Dounreay - The Way Ahead’, UKAEA reported that an additional facility to clean liquid metal from redundant equipment unsuitable for the sodium disposal plant is scheduled to be operational by the end of 2002. The design of this facility is almost
complete and the building in which it will be installed is now in the process of strip out.

This recommendation has been placed in the strategic category and UKAEA’s progress in meeting the requirements of this recommendation will be followed by NII’s monitoring of an appropriate programme.

R49 UKAEA should carry out timely Post-Operational Clean Out and decommissioning work on PFR and associated plant with the presumption that long term care and maintenance is only tolerable where there is a clear safety benefit.

In the audit report, reservations were expressed about UKAEA’s plan to move to a long term care and maintenance period of about 70 years, once the removal of sodium from the reactor had been completed. Over the last few years, UKAEA has focussed on the removal and treatment of sodium. However, significant progress has been made in decommissioning other parts of the reactor including the demolition of the sea water pump house and the removal of most of the steam pipework in the turbine hall. A programme of major modifications, for example, ventilation improvements, is also underway to support future decommissioning activities.

The DSRP programme supplied to NII states that residual sodium will have been removed from the internal reactor components by 2008 and the end of Stage 1 decommissioning will be in 2011. This will result in a significant reduction in the hazard from this facility. UKAEA has revised the overall PFR decommissioning programme strategy to remove periods of care and maintenance since they now consider that there is no advantage to be gained in delaying the decommissioning.

The overall effect is that PFR decommissioning is now programmed to be continuous and complete by about 2038. This is a significant acceleration compared to the previous programme in which the decommissioning end date for PFR was in the region of 2095.

R49 is a strategic recommendation, therefore, UKAEA’s progress in completing this work will be monitored via an appropriate programme arising from the DSRP.

R50 UKAEA should remove the DFR breeder elements as soon as is reasonably practicable and ensure that they reach Sellafield before BNFL’s Magnox Reprocessing Plant closes, or define an alternative method of treating this fuel.

UKAEA has stated that it intends to arrange for this fuel to be reprocessed in BNFL's Magnox Reprocessing Plant at Sellafield which BNFL has indicated will be available until around 2012 (or later depending on plant throughput). The Dounreay Site Restoration Plan currently indicates that the breeder fuel removal operations will occur within a 2007 - 2012 time window. UKAEA has stated that discussions with BNFL over the treatment and transport of the breeder fuel has continued since the
audit and that a preliminary contract has been signed under which BNFL is carrying out technical reviews of processing and transport.

UKAEA is also continuing to investigate alternative means of dealing with the breeder fuel e.g. the possibility of oxidising the metallic fuel so that it can be treated in a similar manner to other oxide fuels.

The removal of the breeder fuel from the DFR reactor will take a number of years to complete and, therefore, this recommendation falls into the long term strategic category. The future progress on this recommendation will be monitored via an appropriate forward programme and our regulation of the DFR project work.

In practice, progress with DFR decommissioning in the past has been poor. The development of a fallback strategy is welcomed and this will be monitored by NII as part of its consideration of the developing fuels strategy.

**R51 UKAEA should vigorously pursue its development of a method for the safe removal, treatment, and clean-up of all sodium/potassium coolant in DFR.**

UKAEA’s current programme shows the bulk of the sodium/potassium (‘NaK’) metal in the reactor to be removed by 2006.

UKAEA is still working on a number of modifications to the NaK disposal plant which is currently programmed to start active commissioning in early 2002, which is approximately twelve months later than the date indicated by UKAEA in ‘Dounreay - The Way Ahead’. A safety report for the modified plant is due to be forwarded to NII for consideration shortly. Additionally, a safety report for the associated Ion Exchange Plant is currently being considered by NII and SEPA. A number of issues raised by the regulators still remain to be resolved for both of these plants.

The removal of NaK residues within DFR primary circuit is considered to be a more difficult challenge than for PFR. UKAEA is now proposing to remove the geometrically complex DFR primary circuit pipework in sections to allow residues to be removed in an additional plant. Trials have already been undertaken to investigate the feasibility of this proposal i.e. cutting of NaK filled pipework, deployment of tooling/robotics and the freezing of the primary circuit vault to ensure retention of the NaK.

It is evident that the technically challenging task of the removal of the NaK coolant from the DFR primary circuit will take some years to complete and therefore this recommendation falls into the long term category. The future progress on this recommendation will be monitored via the forward programme and our regulation of the DFR project work.

**R52 UKAEA should ensure that an adequate plant infrastructure is in place for decommissioning Dounreay Fast Reactor (DFR).**

At the time of the audit, it was considered that UKAEA had not given sufficient consideration to the infrastructure that would be needed to carry out the extensive
decommissioning work at DFR. UKAEA’s response stated that it would carry out a programme to identify the required infrastructure and that the infrastructure necessary for decommissioning would either be replaced or renewed.

UKAEA has carried out a review of the various infrastructure systems and has embarked on a programme of replacement and renewal. As the detailed requirements of the various decommissioning projects have been developed since the initial review was completed, further work has been identified and this situation is likely to continue as the various projects progress.

UKAEA has already commenced work on the installation of new electrical supplies to, and within, DFR, the provision of a new nitrogen supply system and improvements to the DFR ventilation systems.

This recommendation falls into the long term category as the programme of infrastructure improvements covers a number of years and may need to be supplemented as the decommissioning of DFR progresses. The progress on this recommendation will be monitored via an appropriate forward programme and NII's regulation of the DFR project work.

R53 UKAEA should carry out timely Post-Operational Clean Out and decommissioning work on DFR and associated plant with the presumption that long term care and maintenance is only tolerable where there is a clear safety benefit.

At the time of the audit, UKAEA considered DFR and its pond to be under a care and maintenance regime. However, we did not consider this regime to be appropriate for the stage that had been reached in the decommissioning of DFR. UKAEA has now embarked on a project to decommission the DFR pond and we are currently considering the safety documentation for this project which is due to be completed in 2005.

The DSRP indicates that UKAEA has now revised the DFR decommissioning programmes and removed the periods of care and maintenance between the decommissioning stages. The DSRP programmes indicate that Stage 1 Decommissioning will be completed by 2013 and that Stage 2 & 3 will now follow immediately, with Stage 3 decommissioning due to be completed in 2040.

UKAEA has also embarked on a number of other clean up activities at DFR and also preparatory work to facilitate the future decommissioning activities. Although UKAEA’s past record in decommissioning DFR has not been good, it is evident that UKAEA has been undertaking a number of projects to facilitate the technically challenging task of decommissioning DFR.

This recommendation falls into the long term strategic category as the decommissioning of DFR will be carried over the next 45 years. The progress on this recommendation will be monitored via an appropriate programme and NII’s formal regulation of the project work.
R54 UKAEA should carry out the necessary Post-Operational Clean Out and decommissioning to allow DMTR to be brought into a similar state to the materials test reactors at Harwell.

The position at Dounreay contrasted markedly with that for the similar reactors at Harwell, where wastes and redundant equipment had been removed and decontamination carried out.

In the light of further information provided since the audit, we do not intend to press UKAEA for further decommissioning of DMTR at this stage, primarily because there is currently no disposal route available for the resulting waste. We are therefore focussing our attention on the adequacy of the care and maintenance regime for DMTR. This recommendation is linked to R136 which is concerned with improvements to work place standards at DMTR. Therefore, before DMTR enters a care and maintenance period, UKAEA will need to complete its baseline assessment of the current condition of the plant, including the effects of existing internal corrosion.

As part of future site inspection we intend to ensure that issues such as radiological conditions, lack of installed fire detection and alarm, and UKAEA's completion of necessary improvements have been adequately addressed before the care and maintenance period is formally entered. However, the work which has been carried out by UKAEA allow this recommendation to be closed.

R55 UKAEA should remove the radioactive materials from redundant laboratories in the Fuel Cycle Area and decontaminate them as soon as is reasonably practicable, giving priority to Laboratory 33.

Laboratory 33, located in the D1200 laboratory complex, was used for the preparation of irradiated fuel specimens for microscopic examination. The facility ceased post irradiation examination operations in 1993. Although some very limited post operational clean out work took place, the cell had been left largely untouched. Laboratory 33 was highlighted in the audit report as being ‘perhaps the worst example on site of a facility being abandoned when no longer required’.

At the time of the Dounreay safety audit, the primary filtration of Laboratory 33 was poor and the quality of containment was unacceptable for future Post Operational Clean Out (POCO) and decommissioning purposes. Soon after the audit, the primary filtration arrangement for Laboratory 33 was substantially improved.

UKAEA submitted safety documentation to NII in support of the decommissioning of Laboratory 33 which will be completed by 2004. This would be followed by a period of care and maintenance before final decommissioning, i.e. full demolition of the laboratory, is undertaken at the same time as the rest of the D1200 facility.

The loose waste that was evident in the cell at the time of the audit has been repacked into cans for transfer to the ILW storage facilities at Dounreay. The containment afforded by the cans together with the replacement of the primary
filtration system has resulted in a substantial improvement in the conditions of Laboratory 33.

Although UKAEA has carried out significant work to address the requirements of this recommendation, further work is needed and, therefore, the recommendation has been placed in the long term strategic category to be monitored via an appropriate forward programme.

R56 UKAEA as a matter of urgency should carry out Post-Operational Clean Out of the facilities in the amber area of D1203 and decommission the facilities as soon as is reasonably practicable.

The progress which has been made with installation of plant and equipment for POCO of the Amber area of D1203 since the audit is considered to be adequate. POCO is scheduled for completion in September 2003.

However, given the future timescales for POCO and decommissioning it is appropriate for the outstanding elements of this recommendation to be monitored and regulated formally by NII via an appropriate forward programme. The recommendation has been placed in the long term strategic category.

R57 UKAEA should decommission D1204 as soon as is reasonably practicable giving priority to the pond.

UKAEA has produced a Decommissioning Plan and Decommissioning Safety Case for D1204. Stage 1 decommissioning is programmed to be complete by 2004 and will involve the commissioning of a new ventilation system, the clean up and removal of pond liquor and debris from the pond, and the wash out of the head end vessels.

Stage 2 decommissioning is programmed to be complete by 2006 and will involve the size reduction and removal of active vessels, the dismantling of the pond equipment and liner, and the removal of fixed contamination from the building. Stage 3 decommissioning is programmed to be complete by 2008 and will involve the demolition and size reduction of the shielded cells, pond walls and building structure.

In view of the timescales associated with the decommissioning of this facility, it is appropriate that UKAEA’s progress is monitored via a forward programme. The recommendation has been placed in the long term strategic category.

R58 UKAEA should carry out Post-Operational Clean Out and decontaminate the cells in D1217 and complete its decommissioning study and implement it as soon as is reasonably practicable.

At the time of the audit, the D1217 remote handling facility was reported by UKAEA to be under care and maintenance. However, the building was found to contain wastes in the cells and in packages outside the cells. We did not consider this to be adequate care and maintenance.
Since the audit, UKAEA has characterised and packaged all of the loose in-cell waste to allow this to be subsequently transferred to the D9875 Intermediate Level Waste facility for long term storage. Most of the out of cell waste has been characterised and sentenced as Low Level Waste. The removal of the out-of-cell waste has enabled UKAEA to reduce the radiological classification of this area. POCO of the facility, however, has been delayed, due to the fact that the ILW waste plants have only recently re-opened after being shutdown for a period of time.

Following the completion of the transfer of packaged ILW and LLW, work will commence on the decontamination of the internal walls of the redundant cells and also the removal of the shielded windows to allow the cells to be fully sealed during the care and maintenance period.

Although reasonable progress has been made in D1217, further POCO to allow decontamination work still needs to be completed.

Clearly, the decommissioning of D1217 will take several years and this needs to be carried out as part of the overall site decommissioning strategy. This recommendation has been placed in the long term strategic category and UKAEA’s future progress in the decommissioning of this facility will be monitored via an appropriate programme.

R59 UKAEA should remove operational wastes from all cells and facilities within the Fuel Cycle Area as soon as is reasonably practicable.

UKAEA has undertaken some work to remove the historical waste from the cells located in D2001. However, the work associated with the removal of such waste from all cells located throughout the FCA will take several years. Therefore, it is appropriate to transfer this recommendation to the long term strategic category and UKAEA’s progress in completing this work will be monitored by an appropriate programme.

We would expect, however, future operational waste arisings to be removed, as soon as is reasonably practicable, through the existing ILW route in the FCA.

R60 UKAEA should ensure that the decontamination and demolition of building D8550 and the PUMA facility are carried out to its programme.

This facility had been used for criticality experiments since the 1960’s. Although UKAEA had carried out the dismantling of equipment in a number of cells, the PUMA (Plutonium Moderated Assembly) cell which had been used for solid plutonium experiments was the only cell remaining. The audit team’s main concern was the in growth of the gamma-emitting isotope Americium, which increases external radiation levels, making decommissioning progressively more difficult. Therefore, timely decommissioning was sought.

UKAEA accepted that further decommissioning of PUMA should have taken place on an earlier timescale. However, progress had been delayed by the lack of a suitable waste route.
Since the audit, UKAEA has made good progress in carrying out POCO operations of the PUMA cell and size reduction and packing the waste as LLW or ILW as appropriate has been completed. This recommendation has therefore been closed out. Final decommissioning of this facility is programmed for completion in 2004 and progress will be monitored via an appropriate programme.

**R61 UKAEA should make and implement plans to empty the shaft as soon as is reasonably practicable.**

UKAEA used the Dounreay Shaft (D1225) for the disposal of solid waste between 1959 and 1971 as this was an authorised disposal. This is no longer an authorised disposal and a decision has been taken to retrieve the waste from the shaft to allow conditioning for long term storage and eventual disposal.

The audit report stated that the retrieval of waste from the shaft was programmed to take place between 2014 - 2018. In UKAEA’s response document 'Dounreay - The Way Ahead', it stated that it was considering the possibility of advancing the Shaft Retrieval Programme, but added that this depended upon a number of factors, including a successful outcome from a programme of investigative work to provide a full understanding of the hydrogeological environment around the shaft. As this programme of work is not yet complete, and because of other technical uncertainties associated with the project, UKAEA is currently unable to shorten the retrieval timescales.

UKAEA is currently carrying out parallel project definition studies for all the solid ILW projects, including shaft waste retrieval, Wet silo waste retrieval and the new WTP (see Recommendations 62 and 77). The retrieval of waste from the shaft is a very challenging project, however, retrieval cannot start until a number of associated projects have been completed. These include the hydrogeology studies already mentioned, reinforcement of the cliff and the shaft plug (if necessary), control of ground water around the shaft, preparation of the shaft area for engineering works, and the construction of the WTP and Conditioned Waste Store (see Recommendation 77).

The emptying of the Shaft is a major component of the Dounreay Site Restoration Plan. In view of the importance of the Shaft retrieval project, NII will monitor UKAEA’s progress in achieving its declared programme but also continue to press UKAEA to consider the scope for shortening the timescales during its regulation of this project. The recommendation has been placed in the long term strategic category.

**R62 UKAEA should empty the wet silo as soon as is reasonably practicable and not wait for the Shaft to be emptied.**

In the audit report, reservations were expressed about UKAEA’s proposal to empty the wet silo after the shaft had been emptied, which would mean the emptying of the wet silo would not start until 2019. We stated that leaving the wet silo in care and maintenance was not good practice because the waste was not in a passively safe
form. UKAEA has now stated that it is now possible that the wet silo will be emptied before the Shaft and that this is to be confirmed during the project definition studies.

UKAEA has supplied a new reference programme in which retrieval of waste from the wet silo is planned to start in 2011, taking about four years to complete. UKAEA has also stated that if it will bring this timescale forwards if possible. The retrieval of waste from the wet silo cannot start until a number of associated projects have been completed. These projects include: improvements at the wet silo to remove operational equipment, such as the crane bay; preparation of the wet silo area for engineering works; construction of the Wet Silo Waste Retrieval Headworks, and the construction of the WTP and Conditioned Waste Store (see Recommendation 77).

In view of the timescales involved, this recommendation has been placed in the long-term strategic category.

R63 UKAEA should produce and implement programmes for the Post-Operational Clean Out, decommissioning, and dismantling of all of Dounreay's redundant facilities as soon as is reasonably practicable.

UKAEA has produced the Dounreay Site Restoration Plan which is the overarching, integrated high level programme for the site covering (where relevant) the design/construction, operational, post-operational clean out, and decommissioning phases for all facilities on the site (including those yet to be built). It encompasses fuels and waste management facilities, and estates and utilities. It is underpinned by more detailed programmes for individual projects. These programmes allow this recommendation to be closed out.

R64 UKAEA should justify periods of care and maintenance on the basis of a clear safety benefit, and develop safety cases for any plant in care and maintenance.

Since publication of the audit report, NII has developed views on the circumstances in which care and maintenance can be justified and this subject is discussed in internal guidance which is available on the HSE website (www.hse.gov.uk/nsd/waste1.pdf and www.hse.gov.uk/decomm1.pdf)

As part of our assessment of the DSRP programme supplied in response to Recommendation 63, we have considered the rationale for the periods of care and maintenance. We note that there are now relatively few care and maintenance periods and that these are mainly between Decommissioning Stages 2&3 (rather than between Stages 1&2 as was the case in the previous programme). In general we are satisfied that the care and maintenance intervals which still exist can be justified.

UKAEA will be required to produce adequate safety cases for facilities, during any periods of care and maintenance. UKAEA’s progress in producing these safety cases will be considered as part of R92. This recommendation can therefore be closed out.
R65 UKAEA should develop a strategy to ensure that all services and facilities which will be needed during the dismantling of the plant will be available and operable when required.

UKAEA has addressed this recommendation in various parts of the DSRP, but mainly in Volume 4 which covers existing and proposed waste facilities, and in Volume 5 which covers estates and utilities. Our views on the DSRP are presented in Section 3. UKAEA has considered facility-specific requirements as part of more detailed studies underpinning the DSRP. This recommendation has therefore been closed out.

R66 UKAEA should revise its Corporate Safety Instruction on radioactive waste management to align it with modern practice and in particular to require a strategic approach.

Although it was considered that the UKAEA’s Corporate Safety Instruction contained useful information, it was not considered to be adequate in terms of its scope or depth to ensure safe management of radioactive wastes at Dounreay.

UKAEA has revised its Corporate Safety Instruction, to address the points raised in the audit, and this now deals with issues relevant to Cm 2919 and includes the requirement for a site strategy for the management of radioactive waste. These arrangements will need to be amended periodically to ensure that they remain in line with Government guidelines as these change.

The revised instruction now includes the requirement for an integrated waste management strategy; the requirement for a management structure to control and co-ordinate waste management activities across the site as a whole and the requirement to detect leakages. The instruction has also been amended to include general principles and now specifically refers to passive safety, retrievability, monitoring and inspection.

UKAEA intends to implement the revised procedure by means of more detailed lower tier procedures and instructions for individual sites and plants. This recommendation has therefore been closed out.

R67 UKAEA should ensure that the staff complement of the Waste Management Group is brought up to an adequate level as a matter of urgency and expanded as necessary.

At the time of the audit, there were a number of vacancies in the Waste Management Group (WMG) which had recently been set up at Dounreay. It was clear that a number of additional staff were required to develop the integrated waste management strategy and to deal effectively with wastes arising from future decommissioning projects.

UKAEA reported that the three vacancies identified at the time of the audit had been filled by the time UKAEA published its Action Plan in November 1998 and that further strengthening of the group had taken place with seven additional posts
created. UKAEA considered that this had provided the necessary level of management depth for the Waste Management Group.

NII subsequently sought a review by UKAEA to show that the WMG resource remained sufficient, and that mechanisms were in place to subject staffing levels to regular review. UKAEA has responded satisfactorily by confirming that staffing levels are reviewed on a regular basis, and advising that a further increase in staff has taken place as a result of the technical assessment work associated with the DSRP. This recommendation has therefore been closed out.

**R68 UKAEA as a matter of urgency, should complete a detailed inventory of all current wastes on site, incorporating estimates of wastes which will arise from decommissioning.**

The audit team recognised that an important part of managing radioactive waste effectively was to identify all wastes and then develop a strategy for dealing with them. We found that the information for Dounreay wastes was incomplete and for most of the waste streams insufficient information on the quantity, radionuclide content and chemical form etc. was available. The audit team considered that UKAEA’s work in this area needed to be taken forward urgently.

UKAEA recognised that it needed to improve how it accounted for future operational and decommissioning wastes. The requirements of this recommendation have now been met in that a new inventory system has been established at Dounreay which, in addition to recording information on current stocks of waste, also records future operational and decommissioning wastes.

UKAEA has carried out a significant amount of work to compile this inventory and we are satisfied that an adequate response to this recommendation has been provided allowing it to be closed out.

**R69 UKAEA should develop a strategic plan for handling, treatment, storage, and disposal of all radioactive wastes on site, integrated with the plans for operation, Post-Operational Clean Out, care and maintenance and decommissioning.**

UKAEA has addressed this recommendation in Volume 4 of the DSRP (the Dounreay Radioactive Waste Management Document) and in the integrated programme supplied in response to Recommendation 63. This recommendation has therefore been closed out.

**R70 UKAEA should ensure that radioactive waste facilities comply with good engineering and waste management practice.**

At the time of the audit, UKAEA radioactive waste management safety cases were primarily based on risk estimates rather than on good waste management practice and sound engineering concepts. Therefore, this recommendation required UKAEA to review the safety cases for all its radioactive waste management facilities to ensure that modern practice was being followed as far as reasonably practicable.
The requirements for these improvements are being implemented as part of the overall programme for producing new facility safety cases. The requirements for producing, reviewing, clearance and implementation of facility safety cases are now detailed in Corporate and Dounreay procedures. The implementation of the safety cases involves the production of Operating Instructions and Maintenance schedules to comply with requirements of Licence Conditions 24 and 28 respectively. The safety case also identifies plant improvements essential for safe operations and to reduce risks as far as reasonably practicable.

The modern standard safety case programme is still being developed for most of the waste management facilities. Therefore this recommendation has been placed in the medium term programme and will be monitored in conjunction with Recommendations 92 - 95 regarding the management of safety cases.

R71 UKAEA should review its strategy for the safe and timely vitrification of highly active waste.

In the audit report, we noted that Dounreay was UKAEA's preferred location for the treatment of PFR raffinate, although in principle this could be undertaken in existing facilities at Sellafield. UKAEA's current proposal maintains that Dounreay is the most appropriate location for the treatment of PFR raffinate and proposes to build and commission a new vitrification plant between 2007 - 2011 (treating part of the contents of the least active storage tank as part of active commissioning). The vitrification plant, together with storage facilities for the vitrified product, is programmed to come into full operation in 2012. As this facility is very important to the reduction of hazard from D1208 (the Liquid Effluent Storage and Treatment Plant) we would welcome an acceleration to this timescale and we will be looking for UKAEA to make every effort to achieve this.

Since the audit, UKAEA has undertaken further studies into available vitrification technologies, although at the current time a final decision on the technology to be adopted has not been made. We are monitoring UKAEA's progress with the development of the vitrification plant, and we will continue to do this as part of our routine regulatory work. This recommendation has therefore been placed in the long-term strategic category.

R72 UKAEA should develop and implement methods for the treatment and disposal of contaminated oils and solvents.

UKAEA propose to treat contaminated oils and solvents in a new incinerator, the construction of which is currently planned to be completed by 2004. UKAEA has produced a concept design of a treatment facility along with the first stage of the safety environmental documentation required to implement this project. Progress with this facility will be monitored via an appropriate forward programme.

This recommendation falls in the strategic category and, therefore, this will be formally regulated via an appropriate programme resulting from the Dounreay Site Restoration Plan.
UKAEA should improve waste-handling facilities at Dounreay to support the early decommissioning activities at site.

In the audit report, we recognised the need for UKAEA to improve the site facilities for the handling and transport of waste, so that they can cope with the larger quantities of decommissioning wastes that will be produced in the future. UKAEA has outlined its general approach to this issue in Volume 4 of the DSRP and has provided to NII a "Flasks and Waste Routes Strategy Status Report" which describes the current status of the strategic developments leading to the provision of an appropriate transport infrastructure.

UKAEA has set up a project to develop the strategy to a more detailed level so that new flasks, containers etc. are identified, specified, procured and brought into operation on a timescale consistent with the requirements of the DSRP programme. This recommendation has therefore been placed in the long-term strategic category.

UKAEA should build a new import/export facility onto the Dounreay Cementation Plant Store.

The Import/Export Facility proposed for the Dounreay Cementation Plant Store is planned to be operational by 2004. The project definition and scheme design are complete, and competitive tendering has commenced for the production of the detailed design.

This recommendation falls within the strategic category and UKAEA’s progress will be monitored via a suitable programme.

UKAEA should plan for additional handling and storage capacity for plutonium contaminated wastes arising from decommissioning and develop a practical strategy for these wastes.

UKAEA has undertaken a comprehensive review of the long term options for the management of Dounreay plutonium contaminated material (PCM) and the preferred strategy is confirmed to be supercompaction at Sellafield. A Joint Working Group between UKAEA and BNFL has been set up to consider the technical issues, though there are a number of issues yet to be resolved, such as meeting the BNFL Conditions for Acceptance, assessment of the transport logistics, and the timing of quantities of waste transfers. For planning purposes, the DSRP assumes that transfers to Sellafield would not take place before 2010.

Although BNFL has provided an "Agreement in Principle" to the treatment of Dounreay waste, it is undertaking a strategic review of the management of its own PCM. This will determine whether or not it is able to offer a service to UKAEA. Consequently, a contract has not yet been signed between the interested parties, and this may not be available for some time until the issues have been resolved and a price agreed.
UKAEA recognises that there is a risk associated with the Sellafield option and the preferred fallback strategy is to construct a new PCM supercompaction facility at Dounreay, with storage of the waste at Dounreay after treatment. The decision to adopt the fallback strategy, if necessary, does not need to be made for a few years.

UKAEA has estimated the quantity of PCM likely to arise from future decommissioning and has considered the options for increasing the capacity of the existing store, one of which will need to be implemented in the relatively near future. Despite the creation of additional storage space in the existing store, it may be necessary in the future for additional storage provision. Whether this will be necessary is difficult to quantify at present. UKAEA's PCM strategy identifies the need to have the design for a new PCM store (or extension to the existing store) in place about three years prior to implementation.

In view of the timescales involved, this recommendation has been placed in the long term strategic category.

**R76 UKAEA should improve its quality assurance arrangements for plutonium-contaminated and other wastes.**

UKAEA has a facility for the storage of wastes contaminated with plutonium and uranium. All of the drums stored at the time of the audit will need to be re-worked before disposal, because the waste will need to be placed into NIREX standard drums.

A review of the existing system began in March 1998, to define requirements for data on wastes against the Conditions for Acceptance of the BNFL W T Plant at Sellafield. UKAEA’s review resulted in a revised QA procedure ‘Specification for the Management and Control of Solid Intermediate Level Radioactive Waste (ILW) at Dounreay’ being prepared for plutonium contaminated material and other wastes for implementation from March 1999. A copy of this procedure, which was significantly revised as a result of a detailed on-site inspection, has been provided by UKAEA.

UKAEA has complied with the requirements of this recommendation and its revised arrangements have been inspected by both NII and SEPA. In addition, SEPA undertook a thorough review of the quality assurance arrangements for solid radioactive waste at Dounreay during 2001. A number of improvements were identified during this review and UKAEA has now addressed the main issues. The remaining improvements have been placed on forward action plans which will allow us to monitor them as part of our routine regulatory activities.

UKAEA’s arrangements for the management of solid radioactive waste have improved significantly and now reflect those in place at a number of nuclear facilities elsewhere in the UK. This recommendation has therefore been closed out.
R77 UKAEA should bring forward the construction of a versatile intermediate level waste treatment plant and associated waste stores.

In the audit report, reservations were expressed about the planned operational date of 2014 for a new waste treatment facility for solid ILW. The report stated that the plant should be constructed and brought into operation much earlier. UKAEA now plans to bring the new WTP and associated Conditioned Waste Store into operation by 2008, though this facility may be modular with some of the modules coming into operation at a later date. UKAEA is undertaking optioneering studies, as part of the project definition phase of the Waste Treatment Plant, to firm up the range of facilities required for dealing with the existing and future operational and decommissioning wastes.

We consider the WTP and Store to be key facilities for the decommissioning of the site and would welcome a further acceleration of the timescales for bringing these plants into operation if reasonably practicable. This recommendation has therefore been placed in the long term strategic category.

R78 UKAEA as a matter of urgency should institute effective waste minimisation and volume reduction measures for low level waste.

Solid low level waste represents, by far, the largest volume of waste on the Dounreay site. Although, UKAEA was required to review its capabilities and options for the storage and disposal of low level waste (R80), it was the view of the audit team that immediate effective steps should be put into place to minimise waste by ensuring that packaging materials and other unnecessary items did not enter contaminated areas around the Dounreay site as the only exit route would then be as low level waste. Little evidence of proactive waste minimisation or of prevention of unnecessary papers/material entering contamination controlled areas, was found during the audit.

UKAEA introduced an awareness programme to address waste minimisation across the site. Discussions and inspections at Dounreay have confirmed that UKAEA has made significant improvements in the minimisation of LLW in controlled areas. Practices at Dounreay now reflect those in place at many other nuclear sites in the UK.

There is evidence of a growing waste minimisation culture at Dounreay. However, it is recognised that it can be developed further since waste minimisation is an ongoing process. If UKAEA is to pursue waste minimisation with vigour, a more co-ordinated approach will be required. UKAEA’s intention to appoint a waste minimisation manager to oversee waste minimisation issues is supported.

It is accepted that the requirements identified in the audit have been completed and that further progress on waste minimisation will be pursued as part of routine regulatory activities. We note that options for disposal of LLW (and ILW and HLW) are the subject of a consultation process recently launched by the UK and devolved Governments. UKAEA must recognise that their strategy will be affected by the outcome of this.
R79 UKAEA as a matter of urgency should either install a new incinerator for combustible low level waste or find alternative methods for treatment, storage and disposal of these wastes.

The audit report expressed concerns that combustible solid LLW was accumulating on the site due to the unavailability of the LLW incinerator. In Dounreay - The Way Ahead, UKAEA stated that it was considering the options for dealing with combustible solid LLW, one of the options being a new incinerator. Since then, UKAEA has also studied the possibility that a new incinerator might combine treatment of combustible solid LLW with contaminated oils and solvent (see Recommendation 72). As a result of these studies, UKAEA has concluded that there is currently no operational need to incinerate solid LLW. However, the Best Practicable Environmental Option (BPEO) study addressing the longer term management of solid LLW on the site is addressing all treatment options, including incineration.

The backlog of bagged LLW awaiting incineration at the time of the audit has been cleared and placed into 200 litre drums. This will be supercompacted at WRACS in the same way as non-combustible LLW. Fresh arisings are routed through WRACS. As experience of supercompaction of LLW is gained by UKAEA, we would expect an improvement in the efficiency of its LLW disposals via this route. This recommendation has therefore been placed in the long term strategic category.

R80 UKAEA, as a matter of urgency should review its capabilities and options for the storage and disposal of Low Level Waste.

Considerable quantities of LLW will be produced at the site in the future, mainly as a result of decommissioning activities. Disposal of new arisings at Dounreay has now ceased because the original disposal trenches, Pits 1 to 6 are nearly full, and significant quantities of LLW are currently in interim storage. However, this is not a suitable long term management solution for this waste. The availability of a disposal route for LLW is very important for the achievement of the overall DSRP programme. UKAEA is undertaking a BPEO study for the long term management of LLW. Options include disposal to the national LLW repository at Drigg, operated by BNFL, and the construction of a new facility at Dounreay.

We hold the view that UKAEA should dispose of low level waste as soon as possible since recognised methods of disposal are available. UKAEA’s new LLW arisings now comply with the conditions for acceptance at Drigg, therefore, subject to the appropriate authorisations being in place, UKAEA could dispose of current and future arisings of LLW at Drigg. We consider that UKAEA needs to pursue rigorously the Best Practicable Environmental Option (BPEO) study which it is currently undertaking to address the future options for the storage and disposal of LLW.

UKAEA’s current planning assumption is that a new LLW disposal route will be available by 2012. UKAEA has commissioned a considerable amount of work in support of a new facility at Dounreay covering topics such as site justification,
concept designs, performance assessment of long term disposal etc. UKAEA is also seeking an Agreement-in-Principle with BNFL to dispose of LLW at Drigg until a new disposal route becomes available. This would also provide a fall back position for the long term disposal of LLW. UKAEA is investigating the logistical issues required to support this disposal route. Each of the above options will require appropriate authorisations from SEPA and will be the subject of formal consultation.

Current programmes take these issues into account. This recommendation falls into the long term strategic category and therefore UKAEA’s progress will be monitored by an appropriate programme arising from the DSRP.

**R81** UKAEA should develop and implement a strategy for the treatment and disposal of ‘very low radioactive material’.

The strategy for VLRM is intimately linked with that for LLW discussed under Recommendation R80. UKAEA has produced a working definition of VLRM and has estimated the volume of waste arising from decommissioning activities on the site. Studies are also well advanced including a performance assessment of disposed VLRM, concept designs for simply-engineered VLRM facilities, and the interactions between LLW and VLRM facilities.

The issues mentioned under R80 above also apply to the VLRM strategy. This recommendation has also been placed in the long term strategic category.

**R82** UKAEA should improve its co-ordination of emergency arrangements at Dounreay to ensure that all plants have consistent plans and procedures.

Recommendations 82 to 89 inclusive dealt with UKAEA’s Emergency Arrangements. Overall, we considered that although there were good aspects of UKAEA's emergency arrangements they suffered from a lack of co-ordination. A number of specific issues which needed to be addressed where covered separately in each of the audit recommendations.

The appointment of an experienced emergency planning manager and the strengthening of the team has been one of the major factors which have led to significant improvements being made by UKAEA in this area. A new Incident Control Centre (ICC) has been provided for the Prototype Fast Reactor, and for the Dounreay Fast Reactor and within the FCA the existing ICCs has been improved. All of the ICCs are consistent in their information layout and the procedures which are adopted. The PFR, DFR and FCA ICCs have been successfully demonstrated to us as part of annual demonstration emergency exercises. Coupled with the Emergency Command and Control training being provided centrally to all relevant Dounreay staff, provides tangible evidence has been provided of the commitment which UKAEA has given in its response to this group of recommendations.

UKAEA's emergency arrangements will be observed by NII on a periodic basis to ensure that the improvements which have been put in place are still evident. All those recommendations (R82-R89) have therefore been closed out.
R83 UKAEA should continue to develop its arrangements to ensure that emergency manuals and instructions provide clear guidance and instructions for those in positions of responsibility.

UKAEA’s site emergency arrangements have improved significantly since the audit. However, its corporate arrangements and the site specific [Dounreay] Procedures need to address the requirements for facility managers to put in place programmes to ensure that their local emergency arrangements are exercised on a sufficiently regular basis.

Although there was a structured programme of emergency exercises across the site, there is no consistent programme in place for local building exercises. UKAEA’s corporate arrangements do not place requirements on ATO holders to put in place a programme of exercises to ensure, for example, that all personnel on shift working duties receive adequate refresher training and exercising of their building emergency arrangements.

Continuous improvement to UKAEA’s arrangements will be sought as part of the ongoing site inspection activities and formal observation of annual demonstration emergency exercises. This recommendation has been closed out.

R84 UKAEA should continue to develop and operate its arrangements to ensure that emergency manuals and instructions are updated to align with current plant conditions, as part of plant modification procedures.

As required by this recommendation, the development and operation of UKAEA’s arrangements is a continuous requirement. UKAEA’s commitment to this process is evident by its adoption of the International Safety Rating System (ISRS) of Det Norsk Veritas (DNV) which, as part of its requirements (notwithstanding NII licence requirements) identifies the need for auditing and other improvements. Such systems, in conjunction with UKAEA’s amended arrangements to deal with plant modifications etc. should ensure that the local emergency arrangements reflect the up to date requirements of the plant specific safety cases.

The work required to produce modern standard safety cases for specific plants is extensive and the programme to complete this work has been submitted to NII. Therefore, the specific emergency arrangements for each plant will not become finalised until after the production of its associated modern standard safety case. However, the requirements for plant modifications already discussed above and UKAEA’s annual review of each facility’s ‘Authority to Operate’ provides a mechanism, on an interim basis, to ensure that emergency arrangements reflect the current plant conditions.

Some plant-specific emergency procedure documentation has been prepared by UKAEA. However, continued updates and reviews to reflect plant changes will be examined as part of normal site inspection activities. This recommendation has been closed out.
R85 UKAEA as a matter of urgency should continue to develop and implement a comprehensive emergency exercise programme.

Recent improvements in the emergency exercises at Dounreay indicate the improvements which have been made to UKAEA’s emergency exercise programme.

Apart from the annual site emergency exercises which are witnessed by NII, very few local emergency exercises, i.e. at the facility level, have been observed. These exercises can range from ‘tabletop’ exercises involving shift teams to a full simulation of the emergency response including evacuation and personnel accountancy.

However, it is our intention to observe such plant-based emergency exercises as part of the overall examination of the adequacy of UKAEA’s arrangements in this area. This recommendation has been closed out.

R86 UKAEA should ensure that sufficient contracts are in place to provide an adequate resource for an effective and efficient response to incidents and emergencies.

UKAEA’s contractor resource arrangement has been formalised and strengthened. UKAEA’s term contract governing the provision of operational monitoring services covers the requirement for contractors to provide adequate resources during an emergency response. A copy of the contract has been provided to NII.

This contract specifies, for each of UKAEA’s sites, the contractor manning levels for emergency support during normal hours, shift and silent hours together with the maximum distance that they should live from the site. The contract specifies the requirements for training, including their attendance at emergency exercises.

These formalised arrangements will be periodically examined as part of routine site inspection and annual demonstration emergency exercises. This recommendation has been closed out.

R87 UKAEA should continue to develop its arrangements to ensure that all staff with responsibility in an emergency are properly trained.

UKAEA has formed the Emergency Preparedness Team which identifies the roles and responsibilities of key emergency personnel. The adequacy of the training of staff with responsibility in an emergency was considered by NII to be adequate.

The key training requirements are identified in the job description and authorisations manual. To ensure that this training is kept up to date, UKAEA now maintains a database, within the emergency arrangements section, on which all of the staff with key emergency responsibilities are identified. This database is readily accessible from within the Dounreay Emergency Control Centre. Additionally, each person with specific emergency responsibilities are formally appointed by letter and this fact is recorded on the database. This recommendation has been closed out.
R88 UKAEA should develop its arrangements to ensure that Site Shift Managers can provide an effective initial response to incidents or emergencies on all parts of the site.

UKAEA Site Shift Managers are only appointed after they have gained considerable site experience and this is supplemented by a period of training followed by interviews covering technical, managerial and emergency issues. However, prior to the audit there was no formal revalidation of these appointments.

To address this deficiency, UKAEA has carried out revalidation of its Site Shift Managers to ensure that they are fully appraised of all aspects of site operations to allow them to provide an effective initial response to site incidents and emergencies. Additionally, this 'revalidation' process has been extended to include the site shift foremen. This recommendation has been closed out.

R89 UKAEA should ensure that its arrangements provide for UKAEA employees to give authoritative advice in response to an incident or emergency.

The audit revealed that, in some cases, the ATO (Authority to Operate) holder of the facility was not a UKAEA employee but a contractor. UKAEA’s emergency arrangements depend upon the provision of authoritative advice from the ATO. This was not considered by NII to be appropriate, since this would normally be expected to be provided by an employee of the licensee.

UKAEA rectified this deficiency almost immediately. All ATO Holders of category 1 and 2 facilities are now UKAEA employees. This recommendation has been closed out.

R90 UKAEA should improve its arrangements for reporting incidents to NII, particularly during silent hours, with the aim of bringing its practice into line with that of other licensees.

UKAEA’s incident-reporting arrangements, which is a specific requirement of its nuclear site licence, covering the notification, recording, investigation and reporting of occurrences, were considered to be in line with good practice. However, it was considered that UKAEA could be more timely in the reporting of incidents and also, as a matter of routine, the reporting of a wider range of incidents, including those considered to be of less significance.

UKAEA has become a member of a cross-company working group on event recording and reporting. It has reviewed its Corporate Instructions and a company-wide continuous improvement group has been set up to take forward the issues on incident reporting. There has been a significant review of the UKAEA protocols for reporting of minor accidents generally and to NII in particular. The Corporate Instructions have been implemented in local procedures which define the actions required following an event, and the formal procedures for investigating incidents.
At Dounreay, the site Controller of the Day (CoD) is provided with duty information packs which include, in addition to the above, the Obligations of Individuals ‘On Call’. UKAEA has reported that the refresher training of CoDs is still ongoing.

Overall, UKAEA’s incident-reporting arrangements were considered to be in line with good practice and our main reservation was concerned with the rapid reporting of such incidents. Taken together, UKAEA’s reinforcement of its arrangements by the training of the CoDs should result in more timely reporting of such incidents. This recommendation has been closed out.

**R91 UKAEA should improve its arrangements for obtaining and learning from relevant information on nuclear events, incidents, and accidents occurring outside the UK.**

UKAEA did not make use of information from international sources such as the US Department of Energy’s operating experience weekly summaries. USDoE operates similar facilities to Dounreay, therefore it was considered by the audit team that UKAEA could make use of this information on nuclear events and incidents.

UKAEA’s Environmental, Health and Safety (EHS) directory was launched on its intranet service. This directory now provides links to USDoE and other recognised international databases. UKAEA staff now have direct access to this information and the EHS directory has featured as a specific topic in incident feedback sessions conducted across the Dounreay site. We consider that sufficient improvements have been made to allow this recommendation to be closed out.

**R92 UKAEA as a matter of urgency should revise its safety cases to bring them into line with modern standards.**

In the response to the audit, UKAEA accepted that safety cases for Dounreay facilities needed to be updated to bring them in line with current modern practice. UKAEA has since developed revised arrangements and methods for producing safety cases to provide, for example, greater emphasis on the deterministic analysis of the performance of the plant and improved demonstration of the adequacy of the engineering. The first two safety cases produced to these new procedures and methodologies have now been issued. We are currently assessing the D1208 (High Active Liquid Storage Facility) safety case and, as part of the assessment, will comment on the revised scope, format and safety assessment methodologies utilised by UKAEA Dounreay.

As we have not yet been able to assess fully the revised arrangements and methods developed by UKAEA Dounreay to bring its safety cases in line with modern practice, this recommendation has been placed into the medium term category to facilitate the ongoing assessment of the revised processes.

Programmes for revising safety cases at Dounreay covering the next few years have been forwarded to us. UKAEA has prioritised the programme on the basis of safety and the operational requirements of re-establishing the site waste management infrastructure. UKAEA’s progress in meeting its declared safety case production
programme will be monitored by us. UKAEA has stated that during 2001-2 financial
year, all high hazard facilities within the FCA (other than the Fuel Reprocessing
Plant - D1206) will have a revised safety case produced to the current UKAEA
requirements.

R93 UKAEA should ensure that its safety cases are produced in a way which
incorporates the needs of the owners and as such should ensure that they are
clear and acceptable to plant staff.

UKAEA has embarked upon a number of initiatives associated with its safety case
production and implementation processes which should strengthen the ownership
and understanding of the safety cases by plant operators. Procedures have been
developed which should result in the production of future safety cases being more of
a team effort involving plant operators, engineering/scientific specialists, peer
reviewers as well as the safety case authors/specialists. Furthermore, UKAEA
Dounreay has also developed procedures for the implementation of safety cases
whereby the plant operators play a core role.

However, to date, UKAEA has only produced and implemented a very limited
number of safety cases according to these new procedures and initiatives and we
have, as yet, been unable to fully assess the adequacy of these
procedures/initiatives. This recommendation has been placed into the medium term
category to enable us to evaluate further the adequacy of the UKAEA initiatives as
part of the continuous assessment of safety cases produced by UKAEA according to
its future safety case production programme.

R94 UKAEA should increase resources to enable it to produce, assess, and
revise its safety cases in a timely manner.

In its response to the audit, UKAEA recognised that it did not have sufficient suitably
qualified and experienced staff to control and manage the timely production and
assessment of safety cases. UKAEA subsequently embarked on a recruitment
campaign to strengthen the Dounreay team. Given the remoteness of Dounreay
and the current excess of demand over supply of suitably qualified and experienced
staff, UKAEA has encountered difficulties in recruitment.

In the latest position statement on Recommendation 94, UKAEA stated that the
Technical Assessments and Safety Department (TASD), which manages and
co-ordinates the production of safety cases at Dounreay, is “now providing an
effective and adequately resourced service for the production and maintenance of
safety cases for operational facilities”. UKAEA’s resource is being supported by the
extensive use of contractors.

The role of TASD has been extended to provide a support service to the large
number of projects that stem from the Dounreay Site Restoration Plan. Although
UKAEA envisage that the majority of the safety case documentation for these
projects will be compiled by contractors, TASD is tasked to provide safety case
advice, guidance and support to the projects to ensure that the safety
documentation is adequate and consistent with UKAEA requirements. As the
majority of the DSRP projects are in their early stages, the full impact on UKAEA resources to provide this support service has not yet been fully tested.

Another concern in the resourcing of safety case production has arisen regarding the provision of support from Engineering Group at Dounreay. The revised methodologies for production of safety cases in line with modern practice has created demands on Engineering Group resources greater than originally anticipated. At Dounreay, UKAEA has now placed contracts for additional engineering support staff to enable the safety case programmes to be maintained. UKAEA has also recognised the need to increase its safety case peer review resources.

Currently, UKAEA has produced only a very limited number of new safety cases to standards which are in line with modern practice and has yet to demonstrate fully that it has adequate resources to produce, in a timely manner, the forward programme of operating plant safety case revisions and the large amount of safety documentation required to support the DSRP projects. Therefore, we consider that this recommendation should be grouped into the medium term category to enable us to monitor UKAEA’s efforts in providing adequate and sufficient safety case production resources to support the future requirements on the Dounreay site.

R95 UKAEA should ensure that the periodic reviews of safety cases are up to date and that they compare the plant with modern standards, identify shortfalls, and propose reasonably practicable improvements.

In response to the Dounreay audit report, UKAEA accepted that the programme for the periodic review of safety cases was behind schedule. UKAEA has now produced programmes to update all safety cases at Dounreay in line with current practice.

The revised safety case production methods that have been introduced are designed to include, within the safety documentation, a comparison of the plant and equipment within a facility with modern standards, identify shortfalls and propose reasonable practicable improvements. Only two Dounreay safety cases, compiled to the revised methods, have been received by NII and these are currently being assessed. As part of this assessment, the adequacy of the new methods for comparison with modern standards, identification of shortfalls and reasonably practicable improvements will be established.

It is therefore considered that this recommendation should be placed into the medium term category. This will allow us to complete its assessment of the revised methods and to monitor the processes by which UKAEA identifies, prioritises and undertakes the work to complete the reasonable practicable modifications.
R96 UKAEA should provide explicit guidance on the proper safety categorisation of modifications and the procedures related to their management so that proper control, independent safety assessments, and regulatory oversight are routinely achieved.

Recommendations 96, 97 and 98 are all concerned with UKAEA’s arrangements for the control of modifications. UKAEA has undertaken a number of initiatives relating to the safety categorisation of modifications and has produced associated procedures and guidance. However, these initiatives have yet to be fully developed, tested and implemented. Furthermore, in the period since the audit, we have raised further concerns regarding the adequacy of the modification categorisation procedures and/or their inappropriate application. Thus we consider that UKAEA still needs to continue to develop and implement adequate procedures for safety categorisation of modifications and the associated management control processes.

This recommendation will now be monitored via the medium term programme being developed by UKAEA to progress activities being undertaken to resolve outstanding audit recommendations. We have agreed that our consideration of the outstanding issues associated with recommendations 97 & 98 will be subsumed into this overarching recommendation.

R97 UKAEA should cease the practice of subdividing modifications.

The audit team established that it was UKAEA practice for some plant changes to be dealt with as a series of small projects. These smaller projects were considered in isolation to the overall project and consequently they were attributed a low safety categorisation which did not receive rigorous safety consideration. Also these small projects were not subject to controls and regulatory processes which would have been appropriate for the overall project. UKAEA has produced guidance on the subdivision of modifications which, if appropriately followed, should eliminate this problem by requiring an overall view of the project to be considered in the categorisation process.

For this recommendation, we will need to be satisfied that UKAEA has adopted an adequate categorisation process. However, currently we still have concerns regarding this process and this will need to be considered further. However, since the problem of subdividing modifications is considered to be one aspect of the overall categorisation process, then it is judged that this concern can be followed up as part of our consideration of Recommendation 96, allowing Recommendation 97 to be closed out.

Additionally, UKAEA’s corporate arrangements for Licence Condition 22, which deals with plant modifications, are in the process of being produced. These arrangements, together with any associated guidance documents, should provide clarification of the requirements for the categorisation of modifications. The implementation of these arrangements will be periodically inspected as there is evidence to show that categorisation is still not being consistently applied across the site.
R98 UKAEA as a matter of urgency should review and revise where necessary the safety category ascribed to current modifications and satisfy itself that previous under-categorisation has not led to significant safety concerns.

UKAEA’s arrangements for the control of modifications for plant is covered by its Safety Approved Modification (SAM) system. SAMs are categorised by their safety significance. UKAEA has now completed a review of the categorisation of Dounreay SAMs as part of the monitoring and review process for Recommendation 98. This review concluded, on the basis of a 15% sample, that the categorisation of the SAMs was generally acceptable. The review concluded that there was no further merit in continuing with sampling process therefore UKAEA considered that the requirements of Recommendation 98 had been met. UKAEA has stated that the lack of information on the SAM documentation does not readily facilitate a retrospective review of the categorisation process. However, we considered that it was appropriate to carry out further sampling since we continue to have concerns regarding the adequacy of the UKAEA categorisation process. We intend to follow up this issue as part of Recommendation 96 and therefore Recommendation 98 has been closed out.

There are a number of areas for continued improvement including the need for SAM authors to avoid excessive concentration on the installation hazards and to give equal consideration to the effect on plant operation and the safety case. More extensive use needs to be made of the ‘inadequately conceived and executed’ test to establish the sensitivity of the proposed modification to possible errors in design, planning and implementation.

We will wish to examine, as part of our on-site inspection work, that modifications since August 1999 have been correctly categorised and we will need confirmation to demonstrate that any outstanding safety issues are being considered as part of the safety case update programme for the Dounreay site.

R99 UKAEA should update the Maintenance, Inspection and Test Schedules to reflect all the requirements of its revised safety cases.

UKAEA has subscribed to the requirement to produce a clear and logical link between safety cases and Maintenance, Inspection and Test (MIT) schedules. However, UKAEA has only recently issued and implemented safety cases wherein they have demonstrated the application of its procedures and arrangements to effect the link between the safety case and the MITS.

We have yet to complete our assessment of the adequacy of the process and arrangements adopted by UKAEA as well as its inspection of the new MIT schedules. Therefore this recommendation will be considered within the medium-term category to allow us to complete our review of the adequacy of the arrangements developed by UKAEA.
R100 UKAEA should review maintenance across the Fuel Cycle Area to identify and promote best practice and improve standards of maintenance.

At the time of the audit, FCA maintenance was carried out by UKAEA staff within the Nuclear Services Group, with some specialist maintenance being carried out by contractors. The audit revealed that, although maintenance standards within the FCA were tolerable, they were not consistent with the high standards ordinarily expected of nuclear licensees. It was considered that maintenance staff and managers did not set sufficiently demanding quality standards.

UKAEA has taken a number of initiatives to improve the standards of maintenance. The FCA maintenance workload has been reviewed and additional maintenance staff have been recruited. Changes have been made to working arrangements and to methods of training for safety-significant jobs such as crane maintenance. FCA practices have been benchmarked against other UK companies, and UKAEA has increased levels of supervision of maintenance activities. The specific instances of unsatisfactory maintenance identified in the audit report, and in follow-up discussions, have been addressed.

We accept that the issue of improving maintenance standards is being taken seriously by UKAEA, although the benefits arising from several initiatives will not become evident for some time. This recommendation has therefore been closed out. Further inspections of maintenance will be carried out as part of the normal regulatory activities, to monitor the extent to which UKAEA's initiatives have been implemented and are effective.

R101 UKAEA should ensure that safety related maintenance methods, standards, and records are consistent across the site.

The audit established that maintenance outwith the Fuel Cycle Area [which is addressed in R100] was predominantly carried out by contractors. There was a lack of clarity as to how UKAEA monitored the work of its contractors, and established responsibilities for the production and approval of maintenance schedules and instructions and records. Also, there was a lack of consistency in the maintenance record systems used across the site.

In response to the concerns which were raised, UKAEA reported that it was intending to establish more robust, technically competent management arrangements to ensure that the work of its maintenance contractors was more effectively controlled. UKAEA has carried out a benchmarking exercise to compare its maintenance arrangements against a number of nuclear licensees and other non-nuclear organisations. Additionally, an independent assessment was undertaken of the work control and planning methods. The results of these exercises, together with a number of proposals to improve the maintenance systems, have been submitted to us in support of the case for close out of this recommendation.

We consider that UKAEA's benchmarking exercise has identified measures which will support improved specification and control of maintenance at Dounreay.
UKAEA's reorganisation of its maintenance department within the new Engineering Group, will support the development of more consistent maintenance methods and standards across the site. The shift to a single maintenance management system instead of the disparate systems currently in use will further aid consistency. We are satisfied with the initiatives which UKAEA has taken to improve maintenance standards at Dounreay and this recommendation has been closed out. However, further inspections of maintenance will be carried out to monitor the effectiveness of these changes, as noted in R100 above.

R102 UKAEA should ensure that document record arrangements are implemented and relevant records are sent to the document centres and archived in accordance with procedures.

Good records are an important part of a safety management system. Records are needed to demonstrate that the site is complying with the conditions of the site licence, discharge authorisations and other health, safety and environmental legislation. Also, the preservation of adequate records, for example, modifications to nuclear facilities ensures that such plants can be decommissioned safely.

Although UKAEA’s arrangements for the management of records were considered to be adequate, the implementation of these arrangements needed to be improved. The main problem revealed by the audit was related to the retention of records by those producing the records rather than ensuring that such completed records were forwarded to the document control centres for subsequent archiving.

UKAEA has carried out surveys of record holdings across the site to catalogue what exists to remove duplication and this is still ongoing. Detailed record retention schedules have been prepared by UKAEA to meet the requirements of the nuclear site licence, SEPA’s authorisation and other legislation. Additionally, record custodians with responsibilities for specific records have been identified.

For the longer term storage of records, UKAEA is giving consideration to the construction of a purpose built records archive as part of the wider site improvements. Although satisfactory progress has been made in this area, future developments will need to be monitored as part of an appropriate programme and this recommendation has been placed in the medium term category.

R103 UKAEA should ensure that it adopts a systematic approach to goal setting legislation.

The focus on safety at Dounreay is mostly nuclear. However, there are clearly significant conventional safety issues and the audit recognised that these are likely to increase as decommissioning work proceeds. UKAEA had systems in place for the issue of personal protective equipment, including safety shoes and helmets etc., and systems for the display of safety signs and the marking of special hazard zones as part of its management of conventional health and safety. At the time of the audit, UKAEA’s approach to ‘goal-setting legislation’ was not strong in that they did not have an adequate system in place for the production of risk assessments for work activities.
Considerable effort has been expended in producing a procedure to meet the requirements of this recommendation, and this meets the stated aim of providing a systematic approach to goal-setting legislation. This recommendation has therefore been closed out.

UKAEA has introduced a Dounreay Procedure ‘Risk Assessment and Control’ to define the arrangements for the assessment of health and safety risks. This procedure is intended to cover the requirements for assessing the risk from all conventional work activities, i.e. it does not cover radiological, toxicological and environmental risks since these are addressed in other UKAEA management procedures.

The procedure identifies a standard format for the generation of risk assessments to ensure consistency across the site. A key aspect of UKAEA’s arrangements is the identification of appropriate Dounreay Procedures which individuals can use when risk assessments relating to specific hazards are identified, including manual handling and COSHH etc.

Additionally, UKAEA has reported that in excess of 200 personnel have received training on the implementation of this procedure.

**R104 UKAEA should develop comprehensive systems for general health surveillance.**

The work in progress at the time of the audit was not considered to be in line with best practice elsewhere, and little evidence was available to support adequate reporting of workforce health problems.

UKAEA already maintains extensive confidential medical records for its own employees and those of major contractors who purchase Occupational Health Department services from Dounreay. UKAEA considered that extending data collection on work related health issues to contractors working on the Dounreay site would be difficult and was not normal industrial practice. Instead UKAEA maintained that the most practical way of achieving co-operation was by voluntary means, and UKAEA has written to all Dounreay contract organisations requesting their co-operation in the initiative.

This recommendation has resulted in UKAEA fundamentally rethinking its approach on general health surveillance. Some good progress has been made particularly with respect to ill health reporting and the revised approach to contractors health status. This recommendation has been closed out.

**R105 UKAEA should continue to develop its drug policy.**

UKAEA’s drugs policy had been in existence since 1990 and this was based on providing help if asked. The audit team considered that a more proactive policy was required.
UKAEA’s drugs policy has been revised in consultation with employee representation, and this was subsequently endorsed by the UKAEA executive board. The major changes to the revised policy involve pre-employment and random workplace testing for specific substances. Pre-employment testing was started in June 1999, and random sampling of employees and contractors was started in October 1999. UKAEA intend to revise this policy annually.

Positive steps have been taken with this recommendation such that it can be closed out. UKAEA has a defined policy and has taken steps to reduce and remove the possibility of the abuse of drugs by its staff. UKAEA’s actions support and offer help to staff who are found to have a drug problem. UKAEA has confirmed that the new drug policy is part of the UKAEA Management Systems Manual, although the formal review procedure is not yet defined.

Presentations on UKAEA’s drugs policy were given at all of its sites. The policy was intended to raise awareness of drugs, to halt any misuse, to prevent drug users joining UKAEA, and to provide medical help to users. Random testing is drawn from the personnel database and contractors pass database and UKAEA estimate that 5% of the available names will be drawn each year.

R106 UKAEA should ensure that adequate radiological protection advice is available to meet the demands of the site.

UKAEA used to rely upon its contractor, AEAT, for specialist radiological protection advice for work with ionising radiations. UKAEA intends to bring more Radiological Protection Advisors (RPAs) within its organisation and also to employ more of them.

In view of the recruitment difficulties of attracting fully qualified RPAs to the area, UKAEA’s solution of undertaking a training programme is acceptable. We will wish to examine the UKAEA future assessments of the workload and requirements for radiological protection advice as they are updated. In particular, we will wish to be assured that any commercial sell-off of its contractor supplying RPA services to UKAEA will not adversely affect the advice it receives.

UKAEA’s ability to maintain an adequate RPA resource will be inspected as part of routine on-site regulatory activities and form part of the discussions held between site inspectors and Safety Representatives. This recommendation has been closed out.

R107 UKAEA should provide a health physics monitoring service to staff working in high hazard radioactive contamination areas rather than relying on self-monitoring.

As part of its consideration of this recommendation, UKAEA determined that this should mean exits from all C4 areas and from C3 areas except where a risk assessment concluded that this was unnecessary or would be against ALARP good practice.
UKAEA has revised its procedures for personal and equipment monitoring to ensure that these are in accordance with the Code of Practice (CoP) ‘Personal and Equipment Monitoring’. This sets out the requirements for equipment and personnel monitoring from C3 and C4 areas. In addition this was supplemented by an RPA instruction on the monitoring of staff and equipment from C4 areas which makes self monitoring from staff exiting from C4 areas unacceptable.

The requirements of the recommendation in respect of monitoring of people and equipment from high hazard contamination areas have been met and it is therefore been closed out. We are aware that UKAEA is changing its system of categorisation of contamination areas from C1-C4 to designation as low, medium and high. UKAEA will need to ensure that updated versions of the RPA instruction and the CoP on personal and equipment monitoring are produced to reflect this new designation. It is noted that UKAEA has a commitment to review CoPs on a regular basis by its Continuous Improvement Group.

**R108 UKAEA should ensure that sufficient Health Physics Surveyors are available to meet all of the demands on their specialist services.**

The continuing requirement for provision of sufficient Health Physics Surveyors will be addressed as part of our ongoing consideration of Recommendation 24, since the number of surveyors will depend upon the future site strategy and timescales for the introduction of various activities. It is reasonable to expect the need for surveyors to be identified through the new Dounreay human resources and training infrastructure, as well as via the wider organisational arrangements which are now taken to be covered under R24. NII will expect to be able to find a clear and auditable trail from R108 to R24. In other words, the systems put in place under R24 should, at any time, demonstrate that the number and quality of HP surveyors has been considered and shown to be satisfactory.

The current level of resource that is available to UKAEA, under contract, is adequate for the current needs of the site with an adequate number of approved surveyors and supervisors and this recommendation has been closed out. However, we will need to be satisfied that the assessment of the resource requirements and availability has been properly addressed by UKAEA for the current and short term future needs.

**R109 UKAEA should issue practical guidance and instructions on control of contamination particularly for working with pressurised/air fed suits, the use of tents, gloveboxes, and fume cupboards.**

At the time of the audit, little practical guidance was available on these topics. UKAEA has addressed this by producing four Codes of Practice (CoP) which it placed onto its Intranet.

The four CoPs have been assessed by NII and these are considered to be adequate for the purposes of contamination control in the areas identified in the recommendation. UKAEA has confirmed that all of the appropriate staff have been trained and that the CoPs are fully implemented through revised Dounreay
Procedures. An independent audit by UKAEA’s Safety, Health & Environment Division was carried out against the requirements of the recommendation, which concluded it is satisfactory.

We consider that the four CoPs and their implementation represent an adequate means of meeting the requirements of this recommendation and UKAEA’s commitment to ensure that the CoPs are under regular review by its Continuous Improvement Groups is recognised. This recommendation has therefore been closed out.

R110 UKAEA should remove existing radioactive contamination hot-spots where reasonably practicable and ensure that new contamination is removed as soon as possible after it is detected.

UKAEA began work on the clean up of historic hotspots immediately after the audit. This work involved the use of traditional techniques and also the investigation of the use of novel techniques. UKAEA has set a database of the location and radiological details of contamination to allow an action plan for dealing with the contamination to be prepared. This database will provide a useful tool in the management of contamination hotspots. Further guidance on treating and reporting contamination has been developed by UKAEA and this information has been promulgated to staff in training sessions and safety awareness sessions. A demonstration of the database has been provided to NII.

UKAEA has continued to remove historic fixed contamination in plants, notably DFR and D1209, and claim that a much improved attitude towards the removal of any new finds has become apparent. Where plants are redundant and due for imminent decommissioning (e.g. D1204) the removal of historic contamination has become an integral part of the decommissioning programme.

UKAEA carried out an audit of the working of the database and the associated system for managing contamination, in spring 2001. This review highlighted improvements that could be made and a project to modify the system in light of the review is underway. The system for managing contamination has been audited independently by UKAEA’s Safety, Health and Environment Department, which concluded that it was satisfactory.

We consider that the arrangements which UKAEA has put in place to remove historic contamination hotspots and for the management of fixed contamination are adequate. This recommendation has therefore been closed out.

R111 UKAEA should review the equipment and arrangements for personnel monitoring at contamination zone boundaries and at the point of exit from individual plants on the site to bring them into line with modern practice and standards.

This recommendation is closely linked with R112 for UKAEA to install modern walk through monitors with turnstiles at the exits of the main controlled areas on the site. UKAEA has made good, timely progress in response to this recommendation, in particular in the main changeroom of the FCA where a number of walk-through
monitors have been installed together with bringing the barriers, washing facilities, change facilities and entry/exit controls up to modern standards.

UKAEA has carried out reviews of arrangements at facility boundaries and sub-changerooms within contamination controlled areas. An RPA team was used for this review which was carried out against the best practice defined in a Code of Practice. Inspection visits by NII to various plants have clearly showed progress being made in improving the entry and exit arrangements to the plants including the installation of a number of walk-through monitors.

UKAEA also developed a number of initiatives arising from the review. Of these, two have been subsumed into the programme for R112. Progress has been made on the other four initiatives and UKAEA has given an update on the positions.

The work done in response to R111 has been independently audited by UKAEA’s Safety, Health and Environment Department.

We are content that the work that UKAEA has done in response to R111, in reviewing the arrangements against current best practice and acting on the recommendations from that review, together with the forward action plans for plant improvements are adequate. The recommendation has therefore been closed out.

**R112** UKAEA should install modern walk-through monitors with turnstiles at the exits of the main controlled areas on site.

This recommendation is linked with R111 which required UKAEA to review the equipment and arrangements for personnel monitoring at contamination zone boundaries and at the points of exit from individual plants on the site to bring them into line with modern practice and standards. The original expected timescale for closeout was in 2002.

UKAEA has made significant progress in response to this recommendation. Controlled entry/exit from the main controlled areas on site: D1201 of the Fuel Cycle Area, PFR and DFR were completed in 2000 and are now fully operational. Additionally, other walk-through monitors (IPM9) have been installed in areas covering D1224, D2900 and D9867. Another IPM9 monitor has been purchased for the new changeroom being constructed to support the decommissioning of D1204.

Further projects have resulted in UKAEA installing walk-through monitors in the Low Level Liquid Effluent Treatment Plant, D1251 and the changeroom for the decommissioning of the pulse column laboratory. UKAEA has set up a third phase of projects to enhance control of people and equipment from the most significant controlled areas in the FCA and D1209 complex, including walk-through monitors. This is also in response to R111.

To support various decommissioning projects across the site, UKAEA has had designed two modular changerooms, with full facilities, including walk-through monitors and orders have been placed for these.

We are satisfied that UKAEA has made sufficient progress in the installation of walk-through monitors in the main and other areas of the site and the requirements of this recommendation have been met.
R113 UKAEA as a matter of urgency should implement a programme of routine earth testing for the whole of the electrical distribution system and should routinely prove the capability of safety related stand-by power by discharge testing the batteries.

Safety related equipment and systems need reliable electrical supplies. The audit revealed that there was no programme of earth testing on the Dounreay site and in the Fuel Cycle Area (FCA) there was no routine discharge testing of batteries.

UKAEA has implemented earth loop and battery discharge testing at Dounreay for many years prior to the audit, and these tests have shown systems to be robust. A number of one-off tests have been undertaken since the Audit, and procedures are being developed to ensure appropriate and timely routine testing in the future.

UKAEA has complied with the requirements of this audit recommendation such that it has been closed out. The earth loop impedance testing and earth mat testing was completed by UKAEA by May 1999. However, NII required UKAEA to establish a future routine test programme and for this to be included on the computer based maintenance system at Dounreay. UKAEA has confirmed that this has been completed and that this has been subject to its independent peer review process.

R114 UKAEA should review the operation of the Permit to Work system to ensure clearance of permits in a timely and effective manner.

UKAEA carried out a complete review of its Safe Working Systems which incorporates the Permit to Work (PTW) system. UKAEA has also introduced a training module to cover the requirements of its safe working systems.

Specific deficiencies were revealed by the audit in which some PTWs were still in force a couple of years after being raised. The effect of long-standing PTWs on the validity of the relevant safety case had not been considered by UKAEA - this has now been addressed. UKAEA's procedures now require PTW issuers to consider whether a Safety Approved Modification, under its Licence Condition 22 arrangements, needs to be raised.

UKAEA's PTW arrangements and the implementation of this system will continue to be inspected by NII, as part of our routine on site inspection under Licence Condition 26 (Control & Supervision of Operations). This recommendation has been closed out.

R115 UKAEA should install a new Guaranteed Interruptible Distribution system to supply safety-related plant at the northern end of the FCA.

Within the FCA, the policy is to provide battery-backed supplies for nuclear safety related systems, or providing the power from Guaranteed Interruptible Distribution (GID) systems. NII found that some safety related equipment was not battery-backed or on the GID system, especially at the northern area of the FCA. One key omission was the main ventilation fans. An improved FCA GID system was
installed and commissioned in February 2000 and other local back-up power supplies have also been provided for some ventilation systems.

To demonstrate the adequacy of the improved system, a loss of power test was carried out which consisted of shutting off the normal supplies to the FCA and adjacent facilities and observing that the back up generators started up and provided the necessary back up. Although a successful test was carried out, to our satisfaction, a number of in plant items went into alarm during the test. Consequently recommendations for further improvements were made in UKAEA’s test report. We consider the further improvements are being adequately addressed which allow this recommendation to be closed out.

R116 UKAEA should ensure that all necessary safety related equipment, including the ventilation system, is connected to GID system supplies.

As a result of extensive meetings with UKAEA electrical specialists, we are satisfied that UKAEA has carried out the majority of the work necessary to address the requirements of this recommendation. Additionally, a loss of power test was observed on 27 March 2001 in which UKAEA demonstrated the performance of the new system. Although the main stack ventilation system is connected to the GID system, a number of minor stacks within the FCA and their associated ventilation systems have still to be connected to the GID system.

We hold the view that all safety-related ventilation systems should be connected to backed up electrical supplies. However, it is accepted that UKAEA has undertaken considerable effort to connect safety related equipment to the GID system which has allowed this recommendation to be closed.

UKAEA is undertaking a review of ventilation systems in response to R120 to ensure that they meet with best practice. Therefore, we will monitor UKAEA’s progress in completing this work as part of the medium term programme.

R117 UKAEA should analyse the response of the electrical system and its protection to a range of credible faults and carry out any necessary changes to ensure that, so far as is reasonably practicable, only faulty sections of the distribution system are disconnected when faults occur.

During the power failure in March 1998, the electrical protection system operation was not fully understood by those that attended site to recover the situation, and there was doubt as to whether it had operated correctly/appropriately.

Extensive work has been carried out by UKAEA against R117 to address the 11kV supply protection scheme. UKAEA and NII have extended the scope of this recommendation to take account of the 415 system protection scheme and work is continuing in this area. Work on the 11kV protection scheme is complete and we consider that the improvements carried out to date meets the original intention of R117 to allow it to be closed out. Monitoring of the emergent work on the 415V protection system is being carried out as part of NII’s normal regulatory process.
The protection faults which contributed to the loss of FCA supplies in May 1998 have now been corrected. Additionally, the 11kV ring main protection has been upgraded to modern standards with Reyrolle Argus electronic back-up protection relays fitted and commissioned. This work was done as a result of the site wide protection study carried out which highlighted the weaknesses in the protection grading in a section of the 11kV ring.

We assessed the content of a review report produced by a contractor to ensure that, not only was the contractor’s review and resulting recommendations sufficient, but that UKAEA had been able to act as an ‘intelligent customer’ in further reviewing the contractors work, and implementing necessary improvements in response to R117.

**R118 UKAEA should define, through a site services safety case, all service dependencies for safety-critical or safety related systems and make arrangements for their adequate and secure provision.**

UKAEA’s response to this audit recommendation stated that it accepted that site service dependencies should be part of the safety case for each facility and that the overall site services, together with local back-up provisions, should ensure the safe operation and shut-down of facilities. UKAEA also indicated that the site services safety case was scheduled for completion by end of 2001.

UKAEA now intends to produce a document to show that the site services comply with appropriate engineering and safety standards in all important respects and to demonstrate that the services provided to site facilities are adequate to meet their safety-related functional requirements.

A detailed programme of submission dates for this work has not yet been provided to the NII. It is accepted that a considerable body of information on the site services already exists and that some work has been completed or underway in support of providing a safety justification of site services supplies. However, as yet no documentation has been submitted as a formal response to Recommendation 118 and we have not been able to fully assess the UKAEA approach for providing a safety justification for the site services.

UKAEA has stated that as effort becomes available from the safety case projects, currently underway, the site services capability document will be programmed and prioritised appropriately in the context of the requirements of the overall safety case programme.

This recommendation falls into the medium term category and will be monitored as part of UKAEA’s forward programme.

**R119 UKAEA should restore central monitoring of radiological conditions in the FCA.**

UKAEA has reviewed the plants across the site to determine which require centrally indicating, environmental monitoring systems (EMS). UKAEA has appointed a project champion to manage this task. An options study on the range of technical
solutions available has been carried out and from this a specification of requirements has been developed.

UKAEA’s proposal is to introduce EMS into D1200, D1206, D2670, D2001 and D1213. UKAEA is currently in the project definition and planning phase for this work and a programme has been provided to the regulators. This will be followed by the detailed design and implementation phases with the final approval for installation of the EMS being presented in April 2002.

This recommendation falls into the medium term programme of plant improvements which will be monitored as part of UKAEA’s forward programme.

**R120** UKAEA should review and analyse all active area ventilation systems and, where appropriate, bring the systems into line with modern practice so far as is reasonably practicable.

Although active area ventilation systems are installed on many of the plants at Dounreay, it was found that the common active extract system of the FCA (D1209) fell far below modern active ventilation standards. Additionally, there were deficiencies noted in the active ventilation systems for other facilities (D2670, D9867) as well as general concerns about the reliance of these systems on normal, i.e. not guaranteed, electrical supplies. Therefore, this recommendation required UKAEA to carry out a site wide review of active ventilation systems against modern standards.

UKAEA has carried out a site-wide review of the adequacy of the active ventilation systems in all facilities and a number of plant improvements have been identified. Priority has been given to rectifying the specific deficiencies which were identified in the audit report (D1209, D9867, D2670, D1203 and D1208). The improvements to D1209 is a major undertaking which has necessitated the construction of a new building to house new fans and High Efficiency Particulate Air (HEPA) filtration. Although major engineering work for the installation of the ventilation plant and equipment is nearing completion, design difficulties associated with the connection of the new equipment to the existing discharge stack have been encountered that have delayed the project. UKAEA estimate that the D1209 filtration installation project will be completed by 2005, not July 2002 as originally programmed.

In view of the timescales associated with implementing the ventilation improvements across the site, this recommendation will need to be considered as part of UKAEA’s medium term programme of plant and systems improvements. UKAEA’s progress in completing this work will be monitored as part of our routine regulation and site inspection activities.

**R121** UKAEA should review the facilities and arrangements for the monitoring and reporting of airborne discharges and implement reasonably practicable improvements.

UKAEA is permitted to discharge low levels of activity through stacks to the atmosphere and as liquid to the sea. Discharges are regularly monitored to confirm
that activity levels remain within limits set by SEPA. UKAEA was required to review the discharge monitoring arrangements as these were considered to be deficient in some aspects.

An Enforcement Notice was issued by SEPA regarding shortcomings in discharge monitoring procedures which included: storage of samples, sample counting geometry and the adequacy of the sampling data. UKAEA has addressed the requirements of this SEPA Enforcement Notice. UKAEA has reviewed its sample handling and assessment systems and an independent expert review was carried out to identify areas where UKAEA’s discharge monitoring arrangements could be improved. UKAEA set up the Gaseous Discharge Control Implementation Group at Dounreay to advise and assist on issues related to the compliance with the site’s authorisations.

A programme for the installation of modern standards sampling equipment has been prepared by UKAEA. This will form part of the medium term programme of plant improvements and will therefore be monitored by SEPA as part of its normal regulatory activities.

**R122** UKAEA should continue to develop and improve the monitoring strategy for fragments of irradiated fuel in intertidal areas near the site where there is public access.

Beach monitoring has been improved and the new ‘Groundhog’ monitoring vehicle has now been used for some time. UKAEA’s beach monitoring programme has been agreed with SEPA.

SEPA has agreed a number of amendments to UKAEA’s discharge authorisations that have improved the monitoring strategy for fragments of irradiated fuels to allow this recommendation to be closed out. However, continued development of the monitoring strategy will be sought as part of routine regulation.

**R123** UKAEA should review its procedures for the design and verification of safety related computer software systems.

UKAEA has carried out considerable work to date to address this recommendation. UKAEA has reviewed its procedures for the design and verification of computer software systems and has adopted the International Electrotechnical Commission’s (IEC’s) basic safety publication IEC61508 as a basis for developing its own procedures for Electrical, Electronic, and Programmable Electronic Systems.

UKAEA has contracted an external organisation to develop specific procedures for the application of IEC61508. A draft set of procedures have been produced, which have been reviewed by us. However, these have been found to be deficient in some aspects. Comments have been provided to UKAEA and these are being considered by UKAEA.
The further work which needs to be carried out by UKAEA to meet the requirements of this recommendation will be monitored as part of the medium term plan of plant and system improvements.

R124 UKAEA should verify and validate any computer systems used to support criticality control.

One of the principal safety issues within the uranium conversion plants of the Fuel Cycle Area is the control of fissile material in solution or solid form to avoid criticality. The audit team established that the plant personnel were well aware of the requirements of criticality clearance certificates which defined the limits of safe operation. Although a computer program had been developed to assist in the criticality control of the dissolvers, this program had not been subject to independent validation.

UKAEA has replaced the computer systems used directly in the support of criticality control with manual accountancy systems. The other systems used in the nuclear material accountancy do not directly perform a safety function and no direct reliance is placed on the software for criticality control. UKAEA has confirmed that it will not develop software systems for the direct support to criticality control until the procedures required by Recommendation 123 have been fully integrated into its systems.

This recommendation has been closed out but we will continue to monitor UKAEA’s progress in the production of arrangements for the verification and validation of adequate criticality safety software as part of NII’s routine regulatory activities.

R125 UKAEA should review the plant in D1206 and its operation against modern standards and practice and implement improvements where reasonably practicable in the light of its future operation.

The D1206 plant was originally constructed to reprocess Dounreay Fast Reactor (DFR) fuel but was refurbished to carry out the dissolution and reprocessing of Prototype Fast Reactor (PFR) fuel. At the time of the audit the plant was shutdown due to a leak in the dissolver. A second part of the D1206 process was used for the recovery of ‘scrap’ unirradiated mixed oxide materials arising from fuel manufacturing processes. At the time of the audit, there was not a robust and comprehensive safety case for this facility. Also, the condition of the plant was not considered to be of an adequate standard and reflected its age and lack of investment over the years.

On 18 July 2001, the Minister for Energy made an important announcement that ruled out the further use of the reprocessing facilities at Dounreay to deal with the irradiated PFR fuel. In view of this decision UKAEA intend to produce a safety case to cover the shutdown operations of D1206. In advance of the completion of a full engineering substantiation, which is a key aspect in the production of a safety case, UKAEA has carried out a critical plant review. This review was essentially an inspection of the plant services, which was used as the basis for identifying key engineering improvements.
In view of the timescales associated with implementing the improvements identified by the critical review, the completion of the full engineering substantiation and the final production an adequate safety case for D1206, this recommendation has been placed on the medium term programme.

R126 UKAEA should give priority to the production of a complete and robust safety case for D1206 in line with modern practice and undertake no further processing or reprocessing operations (of new or irradiated fuel) until a safety case for those operations has been produced and assessed as adequate.

UKAEA’s response to the audit gave a commitment to producing a revised safety case for D1206 (Fast Reactor Reprocessing facility) in line with modern practice. UKAEA intended that the safety case would review plant safety protection systems against modern standards, identify shortfalls and propose reasonably practicable improvements. The production of the D1206 safety case was stated to have been given priority within the overall programme for Category 1 plants safety cases which was originally programmed to be completed by the end of 2001.

Because of the uncertainty over the future use of D1206, pending the Government decision on the options put forward for managing the fuels from PFR, UKAEA has decided to produce a safe shutdown safety case for D1206. UKAEA has indicated that this case will be prepared by April 2002. However, given the recent Government decision, the scope of this shutdown safety case is likely to be changed.

UKAEA has stated that they will continue to operate D1206 under the umbrella of the current safety cases, produced in 1992/3, with the constraint that only operations specified in its shutdown quality plan will be permitted. This plan defines the identified requirements for surveillance, care and maintenance, and inactive exercising of the plant and equipment within D1206. UKAEA has also reconfirmed that no further processing operations will be carried out within D1206 under the current safety cases.

We will continue to seek that UKAEA produce a robust safety case covering future D1206 operations and decommissioning as soon as possible as part of UKAEA's forward programme. This recommendation falls into the medium term category and will be monitored by a suitable programme.

R127 UKAEA should review the adequacy of the safety features on plant in D1234 and implement the improvements needed to bring it up to modern standards so far as is reasonably practicable.

The requirement of the recommendation will only be fulfilled when the modern standards safety case has been produced and modern standard safety requirements implemented as far as reasonably practicable. However, this is likely to take a number of years to complete and UKAEA has therefore developed a quality plan for shut down.

This recommendation has therefore been placed into the medium term category.
R128  UKAEA as a matter of urgency should critically review the current condition of plant in D1208 and implement a programme of necessary improvements.

D1208 receives, conditions and stores in a number of tanks, the medium and highly active solutions of waste products which have arisen from the reprocessing of irradiated fuel. This plant is one of the major hazard plants within the FCA. Although the original plant was designed and built to the best standards of its day, it was considered that the plant had suffered from a lack of investment over the years. The general condition of the plant in some areas was not considered to be of an adequate standard, therefore this needed to be reviewed by UKAEA as a matter of priority to allow remedial action to be taken before more serious degradation took place.

An engineering substantiation of D1208 was carried out by UKAEA as part of the process of producing the safety case required by R129 to be developed. As part of our assessment of this safety case the engineering improvements which have been identified will be considered. Some of these engineering improvements will be necessary before the resumption of operations in D1208, including the completion of its new ventilation system which was underway at the time of the audit.

UKAEA's progress in completing these engineering improvements for the future operation of D1208 will be monitored as part of the medium term improvement programme.

R129  UKAEA should produce a robust safety case for D1208 in line with modern practice and implement a programme of improvements to ensure that the plant meets modern standards so far as is reasonably practicable.

At the time of the audit, the D1208 safety case did not provide a robust and deterministic demonstration of safety expected. In recognition of this concern, an Improvement Notice was issued in August 1998 which required UKAEA to produce an adequate safety case. UKAEA produced an interim version of a revised safety case for D1208 in April 1999 in response to this Improvement Notice and, after some delay, a full safety case for D1208 was submitted to NII in March 2001. This safety case is now being assessed by the NII.

The D1208 safety case is the first safety case to be assessed by us that has been produced to the revised arrangements and methodologies that have been developed by UKAEA Dounreay as part of its efforts to bring the production of UKAEA safety cases in line with modern practice (See Recommendation 92).

A large number of improvements to the D1208 facility have been identified and we will be actively monitoring the progress of the implementation of the identified improvements within our future inspection of D1208.

The assessment of the D1208 safety report documentation has yet to be completed and the identified programme of improvements to ensure that the plant meets modern standards so far as is reasonably practicable has not yet been
implemented. Therefore we believe that this recommendation should be considered in the medium term category and will be further considered as part of a suitable forward programme.

R130  UKAEA should review the adequacy of the cell ventilation system in D2670, modify it as necessary, and demonstrate its performance through commissioning tests.

UKAEA had doubts as to the adequacy of the containment between the clean transfer cell and the adjacent high active cells following an incident in D2670.

The cell ventilation in the Marshall Laboratory of D2670 had already been reviewed at the time of the audit. Since the audit, improved HEPA (High Efficiency Particulate Air) primary filtration has been installed and the performance of the system has been adequately demonstrated by commissioning. This recommendation has been closed out.

R131  UKAEA should remove all waste materials from the shielded cells in D2670, giving priority to the dissolved Prototype Fast Reactor Fuel.

This recommendation is linked to R39 (and R46) which required UKAEA to implement clear proposals for the management of all fuel on the site. As stated previously, the UK government has recently determined that the reprocessing of PFR fuels will not be carried out at Dounreay and that UKAEA should pursue other options to ensure the long-term safety of the fuels held on the site as part of the future development of the DSRP.

This recommendation is therefore allocated to the strategic category as UKAEA’s proposal for the treatment of fuels and the removal of other waste from the D2670 cells will be included in future development of the DSRP.

R132  UKAEA should develop a strategy for dealing with the Mixed (Uranium and Plutonium) Oxide fuel stored in D2670.

D2670 contained a quantity of mixed oxide fuel in a dedicated store which was to be returned to Germany. However, at the time of the audit UKAEA’s detailed proposals for the return of this fuel was not clear.

UKAEA submitted a Preliminary Safety Report covering the Removal of fuel from the D2670 SNR300 Fuel Store together with a copy of the German submission document for the UK approval of the licence for the container which will be used to transport the fuel to Germany in four separate consignments. Additionally, UKAEA has provided a copy of the current programme which shows the return of the fuel to Germany before the end of 2001.

UKAEA has fully met the requirements of this recommendation, i.e. to develop a strategy for dealing with this fuel, and therefore it has been closed out. We recognise that the final shipment of this fuel may be subject to constraints outside of UKAEA’s control which could impact on the declared date. However, the current
storage arrangements in D2670 would need to be reviewed if any longer term storage of the fuel was required.

**R133** UKAEA should either designate the uranium recovery rig in D2670 an experimental plant operating under close professional supervision with a defined closure date or re-engineer it for a production environment.

The rig had been constructed in a glovebox from proprietary glass sections, plastic and stainless steel fabrications, secured together with plastic hoses and jubilee clips. It was not considered to be up to modern nuclear plant standards.

UKAEA’s response stated that the uranium rig in D2670 would not operate again in its current form, instead the rig would be emptied and stripped down. UKAEA envisaged that there would be a future need for a similar rig for the treatment of outstanding liabilities, therefore they proposed to reuse some components from this rig. UKAEA confirmed that any replacement rig would be covered by its LC 22 arrangements for modifications.

The decommissioning of the rig will form part of the decommissioning plans for D2670 and, therefore, fall within the Dounreay Site Restoration Plan. This recommendation has been addressed sufficiently to allow it to be closed out.

**R134** UKAEA should submit a Preliminary Safety Report (PSR) reviewing options and defining the standards to which the equipment for the D2670 laboratory will be designed and constructed, prior to taking any action intended to lead to any routine fuel processing or reprocessing in that laboratory.

D2670 is a relatively modern facility and was designed and built as an industrial R&D laboratory and is being considered by UKAEA for a number of future tasks. The audit recommendation was raised to ensure that any equipment used in any fuel processing within the facility was adequately designed and constructed.

The UKAEA response to the audit (Dounreay - The Way Ahead) stated that the options for managing the fuel and residues which were originally planned for treatment in D2670 would be considered within the DSRP. The detailed actual requirements for the facility could not, however, be defined within the original DSRP documentation as the future role of the facility was dependent on the awaited government policy decision on the fuel’s processing options. The recent government announcement on the fuels options does clarify the position for some of the options for future usage of D2670. However, the detailed future role of the facility remains uncertain.

Due to these uncertainties, UKAEA has not yet submitted any Preliminary Safety Reports since the audit relating to any new equipment/plant for fuel processing within D2670. Safety documentation relating to the movement and storage of fuels in D2670 has, however, been prepared by UKAEA. UKAEA has stated that a new safety report for the D2670 facility is in preparation which is being produced to the revised UKAEA requirements and standards developed as part of the response to
Recommendation 92. This report is due to be submitted for internal scrutiny in February 2002 and will cover all current and anticipated activities within D2670.

This recommendation falls into the medium term category and will be progressed as part of the forward programme.

R135 UKAEA should, as a preliminary to Post-Operational Clean Out and decommissioning of DFR, review the condition of the building and its services and carry out any necessary remedial work.

The audit report considered that the DFR buildings and facilities showed some signs of an unsatisfactory care and maintenance regime.

Since the audit UKAEA has carried out various reviews and has carried out some remediation and improvement work. New radiological monitoring and fire alarm systems have been installed, the lift has been replaced, redundant equipment has been removed and some decontamination work has been completed. An ongoing programme of work has been identified, for example changeroom improvements, access and escape improvements etc. and it is clear that additional work will be identified over the next few years as the various decommissioning projects progress.

Therefore, this recommendation is considered to fall into the long term strategic category and progress on this recommendation will be monitored via the forward programme and normal regulation of the project work.

R136 UKAEA as a matter of urgency should bring the condition of DMTR up to normal workplace standard.

The Dounreay Materials Test Reactor operated from 1958 to 1969 as a research facility. All fuel and heavy water moderator has been removed and only the structural parts of the reactor core remain within the steel containment building. At the time of the audit, there were large items of bagged waste which had not be disposed of as LLW, together with other discarded items and old equipment. Additionally, the electrical lighting in the facility had deteriorated to the point where this no longer worked and temporary lighting was being used.

This recommendation is linked to R54 which required UKAEA to carry out the necessary Post Operational Clean Out activities to bring DMTR up to a similar state to the materials test reactors at Harwell.

Since the audit, a programme of general cleaning has been completed and the lighting has been replaced. The conditions within DMTR have improved significantly from those observed at the time of the audit. UKAEA has met the requirements of this recommendation to allow it to be closed out.
R137 UKAEA as a matter of urgency should take action to improve deficiencies in the filter arrangements in D9867 ventilation system. This should be carried out independently of any wider review and improvements to ventilation systems.

The lack of secondary filtration on the waste Posting Box has been rectified and the system has been operational since the end of March 1999. A wider review of ventilation improvements is underway.

We assessed UKAEA’s improvements to address the specific deficiency associated with the filtration arrangements of the waste posting glovebox and this was considered to be adequate. However, further work to bring D9867 up to modern standards has not been carried out and this remains to be a concern of NII and SEPA. Although, this recommendation has been closed, we intend to monitor UKAEA’s progress at completing the modern standards work for D9867 as part of the broader requirements of recommendation 120 which requires them to review and analyse all active area ventilation systems and bring them into line with modern practice.

R138 UKAEA should seek to avoid the use of ISO containers as temporary waste stores but where such use is unavoidable there should be more effective control of their contents and better management control of their use.

The audit revealed that, throughout the FCA, waste was being stored on an ad-hoc basis principally in iso-freight containers. (The storage of other larger items of LLW in outside compounds was addressed under R139). Many of the iso-containers were in a poor condition, also the records of the waste contained were inadequate. Some of iso-containers contained wrapped contaminated waste which was potentially ILW.

UKAEA has reinforced its management procedures to require staff not to place LLW or potentially contaminated items outside buildings or in iso-containers. At the time of the audit, there were twenty-nine iso-containers located throughout the FCA. The waste from all but three of the iso-containers has been dealt with. LLW has been removed from the majority of iso-containers and this has been consigned to the LLW stream, in accordance with UKAEA’s arrangements. The three remaining iso-containers contain contaminated residues which will need to be treated within a waste-repacking glovebox within the D1203 facility. UKAEA expects the majority of this waste to be consigned to D9867 for storage as ILW.

Since the waste will remain stored in the iso-containers until it is repackaged and transferred to D9867, then UKAEA’s temporary storage arrangements will be inspected as part of our routine site activities. This recommendation has been closed out.
R139  UKAEA should stop storing large contaminated items of radioactive waste in the open air.

Several large items of LLW including an old flask and a shielded cell window were stored in an open area known as the flask compound.

Soon after the audit, the LLW within the flask compound was removed and sentenced via the authorised route. UKAEA has revised its management procedures and its staff have been informed that radioactive waste or potentially contaminated items must not in future be placed in temporary storage outside buildings.

This recommendation has been closed out; however, the adequate storage of LLW will need to be monitored in future as part of on-site inspection activities.

R140  UKAEA should review its policy on storage of non-UKAEA radioactive waste or material.

A substantial quantity of radioactive sodium from the primary and secondary circuits of a German fast reactor was imported to the Dounreay site during 1996 by AEA Technology, as a tenant on UKAEA’s licenced site, for treatment on a commercial basis. AEA Technology was unable to process the sodium as a result of a prohibition notice being issued by SEPA on the use of the facility and this was subsequently stored on the site.

This recommendation is directly related to R141 which required UKAEA to improve the storage arrangements of the sodium which it had stored in iso-containers on the Dounreay site. The purpose of R140 was to require UKAEA to review its policies which led to the accumulation of non-UKAEA radioactive waste or material.

In responding to this recommendation, UKAEA has set up a detailed record of non-UKAEA radioactive material and waste. UKAEA has put in place a schedule of audits to be carried out by its QA Department against this waste record. UKAEA submitted a report examining the controls and practice relating to non-UKAEA radioactive waste.

UKAEA has also issued a formal Dounreay Notice reminding managers of their responsibilities for ensuring the safe storage of radioactive wastes or materials and identifying the full list of UKAEA procedures which cover these activities.

The comprehensive review of its policy and management systems in this area, the creation of a non-UKAEA radioactive waste and material database and the auditing arrangements which UKAEA introduced has allowed this recommendation to be closed.
R141  UKAEA as a matter of urgency should review the adequacy of the current storage arrangements for contaminated sodium.

A substantial amount of radioactive sodium had been imported by AEAT, and at the time of the audit was being stored in ISO containers on the UKAEA Dounreay site, awaiting treatment by AEAT.

Since the audit, UKAEA has converted a store (DN026) which was originally used as the main engineering store for the Prototype Fast Reactor when it was operational. This redundant facility has been refurbished to house thirteen ISO containers of sodium from the KNK2 reactor in Germany. The ISO containers will be stored in DN026 pending an agreed disposal route. In the meantime, the ISO containers are kept under surveillance and are periodically inspected.

UKAEA has estimated that it would be necessary to store the sodium for 2/3 years until this could be processed in the sodium disposal plant. A fire detection system had been installed in the DN026 facility and this has been connected into the alarm panels in the PFR control room and at the site fire station. The sodium store is subject to a weekly routine inspection of its condition.

The installed monitoring arrangements and UKAEA’s inspection regime are considered to be adequate for the storage of the sodium until it can be processed.

R142  UKAEA should take action to segregate and store or dispose of the contaminated scrap metal at the east of the site.

A quantity of scrap metal which may have been contaminated was stored in the open in a radiation controlled area at the east of the site. This was not considered to be an acceptable means of storage of such material.

UKAEA has confirmed that more than 90% of scrap metal has been monitored and sent for disposal as clean scrap to Seater tip and the remaining material which could not easily be monitored has been packaged in drums for disposal as LLW. On completion of this, the scrap metal compound was monitored and shown to be clean and the fence removed.

UKAEA has revised its arrangements, as part of its response to Recommendation 139, which if fully implemented, will prevent a reoccurrence of similar waste/scrap accumulation problems. This recommendation has therefore been closed out.

R143  UKAEA should respond to the issues and recommendations raised in this report and provide a proposed action plan for discussion with the regulators before 30 November 1998.

UKAEA report ‘Dounreay - The Way Ahead’ was launched at a press conference on 30 November 1998. An associated UKAEA Action Plan, responding to the requirements of the audit recommendations, was published as part of this report.
At the launch of the Action Plan UKAEA explained that the remaining 142 recommendations had been subdivided into 6 themes, with teams working on each of those themes. NII ‘mirrored’ these teams, and identified ‘Champions’ leading the assessment of UKAEA’s responses to the recommendations in each theme, in liaison with SEPA and HSE’s Field Operations Division.

The Action Plan was considered to be a good basis on which to go forward, and we welcomed the reduced decommissioning timescales from those previously indicated by UKAEA. This recommendation has therefore been closed out.
Figure 1: Timescales for some of the major projects in the DSRP

Timelines for the major projects in the DSRP are as follows:

- **Decommissioning**
  - DFR Decommissioning
  - PFR Decommissioning
  - Pulse column glovebox Decommissioning
  - Lab03 Decommissioning
  - D1250, D1229 EMTR Decommissioning
  - D1204, Research reactor reprocessing plant
  - D1217 Redundant PIE facility
  - D1200 Redundant labs
  - D1249, D1256 EMTR & D1256 Super Noah
  - D850, Puma cell & D8526 changeroom
  - D8530 Sodium rig building (includes D8542, D8541 etc)
  - D8571 PIE cells
  - D8914 DMT Storage pond
  - D9000 LSA descaling facility
  - D3200 Waste treatment plant
  - D3210 Condensed waste store
  - Shaft isolation works
  - D3300 Shaft headworks
  - D3310 Silo headworks
  - D2001 PIE facility (including waste posting cell)
  - D9675 RH ILW store
  - D9677 CH ILW store
  - D2700 Cementation plant
  - D2700 Drum store & extension
  - D2700 Import/export facility
  - D1207 New active incinerator
  - D3110 New interim LLW store
  - D3100 Possible low level waste facilities
  - **ILW**
    - Low active drain
    - D1211 Low active effluent plant
    - D9000 LLSEPT
  - **HLW**
    - D1208 HLW/ILW liquid effluent plant
    - D9000 Verification plant
    - D9000 Verification plant product store
  - **Other**
    - Dounreay electrical power distribution
    - ILW flask strategy/Design & build

The operations timeline is available for further operations if required.
Figure 2: Timescales for some key DSRP projects
Figure 3: Example of DSRP sub-programme (Tasks leading to construction of shaft and silo headworks)

Note: This figure is to illustrate the range of precursor or enabling activities which are required before construction of the shaft and silo headworks. It is based on an early assessment of these techniques and is therefore subject to change.